Marine Engineering and Shipping Age

Volume XXVII **September, 1922** **Number 9**

Published Monthly by
ALDRICH PUBLISHING COMPANY
In Conjunction With
SIMMONS-BOARDMAN PUBLISHING COMPANY
Woolworth Building, New York
F. B. WEBSTER, Editor
H. H. BROWN, Managing Editor
L. S. BLODGETT, Associate Editor W. Z. GARDNER, News Editor

Contributing Editors

Rear Admiral C. W. Dyson, U. S. N. — William Gatewood
Captain C. A. McAllister, U.S.C.G. (Retired) — H. McL. Harding
Commander S. M. Robinson, U. S. N. — William F. Donnelly
Winthrop L. Marvin — James L. Bates

WE GUARANTEE that of this issue, 5,250 copies were printed; that of these copies 4,196 were mailed to regular paid subscribers, 110 were provided for counter and news company sales, 231 were mailed to advertisers, 29 were mailed to employees and correspondents and 684 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 49,500 an average of 5,500 copies a month.

MARINE ENGINEERING AND SHIPPING AGE is a member of the Associated Business Papers, Inc. (A. B. P.), National Association of Periodical Publishers, Inc., New York Business Publishers' Association and the Audit Bureau of Circulation (A. B. C.).

Requests for change of address should reach us two weeks before the date of the issue with which it is to go into effect. It is difficult, and often impossible, to supply back numbers to replace those undelivered through failure to send advance notice. In sending us change of address, please be sure to send us your old address as well as the new one.

Prod the Party in Power Into Action

IF there is one fault of the American people that is more outstanding than any other, it is their lack of interest in their own Government. Intense attention to business, which has resulted in the development of the resources of this country far beyond that of any other has left them with little time or inclination to "Render under Cæsar those things which are Cæsar's." The payment of taxes is not a citizen's whole duty. He must be prepared to vote intelligently and to help form a public opinion that will in no wise leave Congress in doubt as to the wishes of their constituents.

It is a favorite pastime to criticize our legislators particularly along the line of inaction, but, where there are so many divergent interests, it cannot be expected that any set of men can hope to read public opinion correctly, if America is to continue apathetic on questions of vital importance.

There can be no reasonable doubt that the vast majority of our people want to see our merchant marine firmly established and developed. A good many, however, are not convinced that a subsidy is the only way in which this can be accomplished. They know in a general way that our ocean-going shipping was practically negligible in 1914 and that later it was necessary to spend enormous sums of money in hurriedly constructing vessels to take the place of those being sunk by the German submarines.

The necessity for a merchant marine was apparent then but the reason why there was not an adequate number of American ships and the reason why millions of tons of our vessels are tied up today has really never sunk in because the interests who handle this business have taken good care to confuse the issue.

It would seem that our experience in the last sixty years of trying to build up and operate a merchant marine without Government aid would be convincing enough. It would seem that with fully one-half of the world's idle tonnage American owned while only one-fifth of the world's tonnage is under the American flag would show us that we are not getting anywhere near our share of the world's commerce. But this is not sufficient and, if the American people do not take enough interest to demand and insist that their representatives grant National aid of a nature similar to that which has been recommended by the best experts in the country, we will never have a merchant marine.

The subsidy is the answer until someone can show another way to make up the differences between the wages of the shipyard workers and the operating costs over that of other countries. The opponents to the shipping bill in Congress are not anxious to bring the matter to debate. They would far rather delay action on the bill and allow it in that way to die a natural death. But, if public interest could be aroused sufficiently to demand a decision on this matter, at this session of Congress, we need have little fear for the future of our merchant marine.

Standards for Export

ACCORDING to a report from the American Engineering Standards Committee, Germany is trying to impress its standards on all import countries. "The day may not be far distant," it is stated, "when American manufacturers will receive inquiries from oversea countries to furnish goods according to the German national standards, and it behooves us to plan in time to meet such conditions."

As an instance of how a standardized industry could be made of great value in securing foreign trade for Germany, a case is cited where "nineteen German manufacturers and one Swedish manufacturer were executing an order for seven hundred locomotives for Russia, all of the same design. Every part in every one of them was being made interchangeable with the corresponding part in all the others, all parts having been manufactured to the same fits and tolerances." This feature, it is claimed, "will have the great advantage of permitting the Russian railroads to use

Generated on 2024-09-12 11:27 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

any disabled locomotive as a store of spare parts for all the others. In one case a locomotive was assembled from parts machined in twenty different shops, with no more difficulty than a locomotive which was built complete in one shop."

Of course the inference is drawn that any future orders for locomotives from Russia will be strictly according to the design for these seven hundred engines which are built to German specifications and therefore German manufacturers will have a great advantage over those of other nations. It is not clear, however, what action should be taken by America to prevent the loss of foreign trade through Germany and England forcing their standards on other countries.

This much, nevertheless, is certain that we have the largest domestic market of any country to standardize for. Our export surplus which is claimed to be not over 15 or 20 percent on the average has all the benefit of quantity production and it is where mass production has been taken advantage of, as in the case of typewriters, harvesting machinery and automobiles, that we have achieved the greatest success in our foreign trade. It is our opinion that more could be accomplished for America at present by evolving some method of financing foreign trade but, at the same time, we should keep abreast of both England and Germany in the prevention of waste by standardization.

Shall We Depend on the British?

IT has been stated that a much deadlier poison gas is now known than any which was used in the great war and that it can be put up in spherical glass containers of about 4 inches in diameter. One aeroplane could carry a sufficient number of these gas bombs to completely destroy all life in a city for the gas would remain in the narrow streets for days and would quickly permeate into cellars and subways.

We also learn that incendiary bombs of small compass but containing thermit have been invented. Anyone who has seen this substance used in welding operations will realize that it will burn its way through steel and cannot be extinguished. A shower of such instruments of destruction would be a catastrophe that Sodom, Gomorrah, Pompeii or Mt. Pelee could not eclipse.

Right here is the greatest argument for a ship subsidy. If such things are possible, we should not only have as good a Navy as any nation but a real merchant marine with its quota of fast passenger ships capable of making a speed of over 20 knots and so designed that they can be quickly converted to aeroplane carriers. We should make it certain that any fights in the future shall occur away from our shores and the only way to do this is to provide a sufficient subsidy to secure the construction and operation of the type of vessels that will not only help us commercially but also prevent terrible destruction in case of war.

Joseph W. Powell says that the Washington Conference clinched the supremacy of British sea power for the next decade. He is absolutely right, for England would still be mistress of the seas if every warship was sunk because her merchant marine and naval bases are superior in number and strength to those of any other nation.

England has constructed since 1905 twenty-seven passenger ships capable of making over 20 knots speed. All of these ships are over 10,000 gross tons. We have one vessel of 8,225 gross tons having a speed of 20 knots.

If we are going to have the protection of such vessels, they must be constructed, for they do not exist. The Shipping Board with all its surplus vessels has none. But, if a reasonable subsidy is provided, men like W. A. Harriman stand ready to do their part and this fact has been proved in Mr. Harriman's case by the money that he has already invested in American shipping.

Vote on Subsidy Bill Deferred

PRESIDENT HARDING has agreed to a postponement of action on the Administration shipping bill until after the November election. But in doing so he has made it clear that he is still very much in earnest about the passage of this measure and that he still thinks it so important to our commercial prosperity and so essential for our national security that he sanctions the delay only because he fears that the attention of Congress cannot be riveted on the bill at this time.

Had it not been for the extraordinary industrial situation, namely, the coal and railroad strikes, which have taken practically his whole attention, the President undoubtedly would have invited conferences of the Congressional leaders to iron out the differences of opinion that have arisen in regard to the inforcement of prohibition on American passenger ships and other matters. But he believes that until a way can be found to straighten out these difficulties, so that they will meet the approval of all supporters of an American merchant marine, it would only jeopardize the bill by pressing for immediate action.

We are sorry that we cannot agree with the President's opnion that delaying action will help matters. We believe that the longer a vote is deferred the greater will be the opportunity for the alien propagandists and pacifists who make light of the necessity for a merchant marine as an auxiliary navy to defeat it. What a triumph it would be for those who are willing to place the United States in a position of dependence on the Navy and merchant marine of Great Britain to put American shipping in a position that it could take only such commerce as the other nations were willing to give it!

The President has intimated that should it become necessary to call a special session of Congress in order to get the subsidy bill written into the statutes he would do it. Let us hope that he meant what he said and that a special session will be called immediately after the election and kept in session until action is accomplished. History shows no example of a successful commercial nation that depended upon other powers for the carriage of its merchandise or for naval protection. If the subsidy bill is not enacted, American ships cannot compete with those of other nations and our prestige as a country will surely suffer.

No matter which way the election goes there will still be the same Congress during the short session commencing December 4. Therefore, President Harding with his unprecedented Republican majority in both houses of Congress ought to be able to make the subsidy bill a law even if a Democratic landslide occurs.

Generated on 2024-09-12 11:22 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Boom for Shipyards If Subsidy Bill Passes

Cost of Subsidizing Ships Should Be Considered as Investment Paying Dividends in Increased Trade

By Hon. William M. Calder*

I ASSUME that no American citizen would oppose the creation of a great merchant marine. I know that all our people would like to see the ensign of their country floating at the masthead of ships in all ports of the world. But while it is pleasing to think of this, we must bring ourselves to the realization that its consummation can come only when we shall have adopted the means necessary to translate it into actual achievement.

It is a strange fact that some of our citizens who desire that America shall be supreme in the peaceful navigation of the seven seas would refuse to give their assent to the means through which this could be accomplished.

In reality the cost of the subsidization of the merchant marine would amount to nothing, for the benefits resulting from such an enterprise would be so great as to make the "investment" look trivial in the extreme. It is an investment which will pay enormous dividends in the shape of increased trade.

To embark upon an enterprise such as the President has already outlined would be to commit the country to an industry which before very long would become almost incalculably productive.

American shipyards would become more active than any of the plants on the Clyde, and soon we would have an army of trained and well paid mechanics who would rival anything that Scotland, England or Wales has ever produced.

Many of our citizens deplore the fact that less than twenty-eight percent of our commerce is carried in American bottoms, but when it is suggested that practically all American goods can be carried in American ships if we will only be wise enough to equalize the difference between the freight costs in foreign bottoms and American ships, they hesitate to take the steps necessary to assure such equalization.

They balk at the word "subsidy." Some of them even go as far as to say that it is synonymous with the term "graft." In reaching this conclusion they are deluded by an illogical method of thought. They forget that if their desires for an American merchant marine are ever gratified we must either pay American seamen the wretched dole that is given by European and Asiatic countries or give the American shipowner the benefit of Federal aid.

No one wishes to see the standard of living for American seamen reduced to the low levels of European and Asiatic standards. We all want American workers to be well paid, well clothed, and well fed. We want not only to build and operate a great merchant marine, but we want the ships manned by robust, wholesome men who are paid wages sufficient to enable them to lay up something against that time when adversity may overtake them. In other words, we desire that the American citizen who makes his living at sea shall enjoy the same benefits of his citizenship as his more numerous countrymen on land. It is worth paying a subsidy if only to assure the employment on American ships of men who truly represent American ideals. We want no impairment of American manhood whether that manhood is employed in the Arctic Ocean or in the congested cities of our great country.

Some of our farmers have criticized the proposal to build and operate a great merchant shipping industry through the temporary assistance of the government; and yet agriculture will be the chief beneficiary of such an arrangement. What farmer is there who does not desire that American fruit, American meat, American wheat, American corn and American cotton shall be carried to the ports of the world in American ships? Through the assistance given by the government, American ships will be able to enter into successful competition with foreign vessels and new and extensive markets will be found for American farm products.

Moreover, a merchant marine in time of war is an absolute necessity. The greatest navy that was ever built by any nation that ever existed, would be helpless without supply ships. The fighters must be fed. God forbid that we shall ever have another war; but if it should come, let us not be caught in the condition of unpreparedness in which we were found when the late struggle was forced upon us. I refer of course to our condition of unpreparedness in relation to necessary merchant ships.

It is humiliating to recall the fact that two-thirds of our soldiers were transported to France in British vessels. Our Navy convoyed them, and without the loss of a man, but we had to depend upon our chief associate in the war to get our men to the French front.

If the Germans had been successful in their submarine warfare, we would have been left with a great and efficient Army which because of the lack of necessary transportation facilities could not have taken, for a long time at any rate, an effective part in the terrible conflict. No doubt American genius, loyalty, patience and courage would at last have found a way to circumvent the enemy. But why allow ourselves to get into a condition where in time of emergency we are compelled to rely upon the shipping resources of another power?

I regard the general proposition of a ship subsidy plan in much the same light that I do the principle of a tariff to protect our American industries. Let us have a great merchant marine and be ready, as good and progressive American citizens, to pay the cost. The price will be comparatively small, while the ultimate returns will be incalculable.

* United States Senator from New York.

Ship Subsidy Vital to United States, Says Harriman

W. A. HARRIMAN, chairman of the United American Lines, declared recently in a newspaper interview that the position of American shipping is precarious. World trade is badly depressed, he said, and ocean rates are low and operating expenses high. Foreign shipping suffers from this condition, but American shipping suffers more because it costs more to run boats under the American flag, and because we have had less experience in world trade. The next five or ten years will be highly competitive ones and will test the strength of the shipping organizations of the various countries. Those which cannot compete will be forced to quit. Under these circumstances I consider the ship subsidy question a vital one for this country. If Congress sees fit to pass the subsidy bill, thus giving American shipowners assistance which is needed to see them through this critical period, I will then feel confident of the future.

Generated on 2024-09-12 11:27 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Failure of Shipping Bill Means Government Ownership

If Merchant Marine Is Not Established Through Pending Legislation, It Will Be Maintained by Shipping Board

By "Old Scotch"

"WE will fight it out on this line, even if it takes all summer" was a declaration of General Grant in his campaign before Richmond. History records that it took him more than "All summer," but that eventually he won out.

The campaign for the subsidy bill seems to have resolved itself into a do or die proposition, and all the proponents of the pending legislation need is some of the indomitable spirit of Grant. Our cause is a just one, and notwithstanding the dismal outlook, at this writing, for legislation of any kind, we can console ourselves that the outlook is no more discouraging than that which faced General Grant, or similar outlooks of various other persons and classes in the world's history, who have accomplished great things by knowing that the causes which they espoused were righteous ones, and who had the will and determination to win because of that knowledge.

People generally have no use for "quitters," and, while I hesitate to place some of the proponents of the subsidy bill in that class, the fact remains that some of our number seem to be getting a little weak-kneed, to place it mildly. After all is said and done, what finite thing has developed to make any one weaken? The opposition to the bill in Congress is not based on the broad principle of a merchant marine or no merchant marine. Opponents have merely criticized certain phases of the bill, and made mountains from mole-hills of things which in a close analysis are more or less trivial. Such propaganda as has appeared in unfriendly newspapers is plainly based on the efforts of foreign rivals to defeat the bill and is disguised by American writers, who are not conversant with the subject, so thinly as not to hide its origin from readers who know the subject in all its phases.

Shall It Be Government Ownership?

There is one outstanding feature of the entire controversy that is so plain that it can be discerned by any one of fair intelligence and unbiased judgment, and that is, the American people at large are determined to have their own merchant marine. If it is not to be established through the medium of the present legislation before Congress, which represents the consensus of opinion of those best informed on the subject, there is little doubt but what it will be maintained as, at present, under Government ownership. The most bitter opponents of the subsidy bill have never questioned the idea of our having an American merchant marine, and no sentiment throughout the country has developed against that fundamental idea. So the alternative is, if this subsidy bill does not pass, we will find ourselves so firmly committed to Government ownership and operation that we cannot extricate ourselves from that much to be dreaded state of affairs.

There is in this country today a deep-seated leaning towards Government ownership of common carriers on land as well as on the sea, which should not be overlooked by those opposed to this semi-socialistic doctrine. Let our foreign rivals, who are trying their best to defeat the present bill, take heed of this warning. The very thing most dreaded in maritime nations abroad is that Uncle Sam will continue to operate his own merchant ships, if we can believe the editorial comments of leading journals. Hence, if by any chance they can succeed in defeating the subsidy bill, the avowed object of which is to place our merchant shipping in private hands, they will, beyond peradventure of a doubt, be confronted with a fixed determination on the part of this Government to continue in the shipping business as at present. The present Shipping Board has made gigantic strides in clearing up the fearful muddle in which our shipping was plunged during and just after the great war. Inefficiency, extravagance and downright crookedness have been almost entirely eliminated, and today the Shipping Board fleet is being operated almost as well as it could be in private hands.

Shipping Board Management May Appear Desirable

No one is making any money out of shipping at this time, because conditions of world commerce were never before at such a low ebb. Conditions cannot and will not long remain in this unusual state of depression. If freight rates, now lower than they have been in years, should advance to anything like normal, in all probability the books of the Shipping Board would show a small profit to the Government instead of the gradually decreasing losses at the present moment.

Efficient Government ownership and operation by the United States would be very difficult to beat by any foreign competition. Federal enterprises would not be compelled to show any financial profit, which would remove almost the entire handicap which surrounds private ship operation under Government ownership. The capital is already provided by the actual possession of the necessary ships, the cost of which, in the minds of the public at least, has already been charged off as a war cost. Depreciation charges just sufficient to provide the necessary replacements of more modern and efficient ships, of a number to equal the actual needs of transacting only sixty percent of our water-borne foreign commerce, the aim of our present shipping ambitions, would not be a great deterrent in a Government-owned merchant fleet. Honest and efficient management in the purchase of fuel and supplies, and the making of repairs, for such an enormous fleet such as we already have, under the present efficient Board, would be a great handicap for foreign competitors whose merchant fleets are divided up among innumerable private owners.

Big Undertakings Our Specialty

When it comes to quantity production and management the United States has always been supreme in any competition. The American mind seems to grasp great undertakings much better than any other, because we are all trained to think and act in large units. Nearly every one of the great basic industries upon which mankind's wants are filled are found in this country in a predominating state of development. Shipping, in the last half century, is the one outstanding exception to this general rule. When we start in to make this a success comparable to other great basic industries in which we are paramount, whether it be in private hands or by force of circumstances it is placed in public control, we can and will assume our rightful position.

We demonstrated what we could do in this line during the late war, when, waking from a somnolent state of our shipbuilding industry, we applied our national characteristics of energy and determination and in three years assumed the leadership in the world for ship production. Of course, due to the necessities of the world-wide strife, this great produc-

Generated on 2024-09-12 11:29 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

tion of ships was brought about solely by the Government, but it shows what we can do with our enormous resources and capabilities for tackling large jobs.

THE DIE IS CAST

There are but a very few Americans conversant with shipbuilding and ship operation who want to see our Government remain in the ownership and operation of merchant shipping. But the die is cast, the American public is awakened to the absolute necessity, for purposes of trade as well as of defense, of American control of a sufficient merchant marine for our needs in peace and war. If the opponents of the pending shipping bill can by taking advantage of legislative entanglements and political exigencies succeed in defeating the subsidy bill now before this Congress, there is but one inevitable alternative and that is a continuation of existing publicly-owned and operated shipping. The relief to the taxpayers, which is bound to follow improved conditions in ocean shipping returns, will convert many citizens to the continuation of the Governmental control of sea transportation.

It is needless to dwell on the tremendous effect such an unfortunate conclusion would have on that ever-present menace of Government-owned and operated railroads, and the eventuality of Government control of all means of transportation. The present deplorable mix-up between railroad owners and employees is daily adding fuel to the flames, and the long-suffering public may "first pity, then endure and then embrace" the temptation of what they may conclude is, after all, the only solution of transportation ills on land and sea.

PRIVATE OWNERSHIP DEPENDS ON SHIPPING BILL

It therefore behooves everyone of us who is not in favor of Government ownership of the means of transportation, and fortunately it is believed we are still in the great majority, to lend all aid to the passage of the subsidy bill, the only known means of placing our shipping in private hands at the earliest practicable time. The subject has been thrashed over and over for years by the best talent in the country, and the predominance of opinion, by those qualified to know, is that the bill as now drawn is the only method of accomplishing this aim. Discriminating duties, such as are now authorized by law, might have been the proper means for accomplishing the end, but that seems to be impossible of enforcement, so we will have to dismiss it.

The writer still believes that the administration bill can be enacted into law, despite the seemingly impossible tangle in which all legislation at this time appears. Worse predicaments than the present one in Congress have been ironed out by force of public sentiment. The subsidy bill should be passed before election day. Those in charge should not listen for a moment to the blandishments of half-hearted supporters nor to the threats of whole-hearted opponents. If action is postponed until "next session," as is now being advocated, the bill will fail and, failing in this Congress, a great step will have been taken towards Government ownership for sea and land transportation.

Foreign Dread of the American Shipping Bill

America, with Harbors Fronting on Two Great Oceans, Will Inevitably Become Greatest Sea Carrier, If President Harding's Bill Is Enacted by Congress

By Winthrop L. Marvin*

IT is no disparagement of the pending shipping subsidy bill for the advocates of the measure to make it clear at the outset that they cherish no delusion that a great merchant marine can be created by the sheer force of National aid or subsidy alone. Encouragement to ocean shipbuilding and navigation is the universal policy of all nations having a sea front and a commerce. But it is not to be pretended that the amount of the National aid or of the subsidy is an unvarying measure of success attained. This success depends upon the native aptitude of each nation for maritime adventure and the degree of circumstances or conditions favoring it.

The British, pioneers in subsidies (to their great National mail lines), have been brilliantly successful. So has another insular race, the Japanese. This is not primarily because the British and Japanese happen to dwell on an island or islands. It is rather because both Great Britain and Japan are enterprising commercial and maritime peoples, having aspirations and resources for wide-flung seaborne trade.

These two nations were predestined for success upon the ocean. They have won that success with the help of persistent expenditures for the direct encouragement of their steamship services, and they have attained their object at no excessive cost. In their cases National aid, inherent aptitude and trade opportunity have coincided in a remarkable degree.

Take another example—that of France. The French have expended far more money in National aids and subventions than has Japan—partly because they began their policy of aid long before Japan did—in 1881 instead of in 1896. For a long time success with France hung in the balance. Her merchant tonnage did not increase at once, as Japan's did. This was in part due to imperfect methods of detail in French laws bestowing subsidies and subventions. But it ought frankly to be recognized that it was due also to the fact that France was not so distinctively a maritime nation and an expanding commercial nation as Great Britain or Japan, or, as we might well add, America.

France in the seventeenth and eighteenth centuries disputed with Great Britain the mastery of the seas. But France in the Napoleonic wars was beaten at sea as she finally was on land, and forced to a subordinate position in her navy and her merchant shipping. The French genius shone best in other lines of effort than in shipbuilding and navigation in the nineteenth century. France's population, moreover, became stationary and even declined, so that the nation lacked the vital stimulus of colonial expansion. Moreover, the products of French industry, while of high intrinsic value, are and have been of relatively small volume, thus failing to furnish the bulkier cargoes for the outward voyage. Further, France, since the war of 1870-1871, had no super-abundance of coal and steel for shipbuilding.

PERSEVERANCE BRINGS SUCCESS

Thus, because of basic reasons with which subsidy had nothing to do, the foes of National aid for some years after

*Vice-president and general manager, American Steamship Owners' Association, New York.

Generated on 2024-09-12 11:21 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

1881 were encouraged to point to France as an example of the ill-success of a subsidy system. But no thoughtful advocates of a policy of National aid by subsidy or in other ways had ever assumed that all nations that tried subsidy would succeed in equal proportion to the amounts expended. There is nothing magical in a shipping subsidy itself. To achieve the maximum results it must be joined with other factors of aptitude, enterprise, zeal and favoring conditions. France happened to face conditions many of which were unfavorable, and, therefore, because of the imperfection of her earlier subsidy laws as well as because of natural handicaps already outlined, her progress in the rehabilitation of her merchant shipping under subsidy was for a long time slow and discouraging.

But the French, a brave race, a gallant race, a patriotic race, steadily persevered. They revised and re-revised their shipping laws, attempted new expedients, ceased to favor sail ships at the expense of steamships, and generally learned wisdom from experience. As a direct result, French merchant shipping, which even with subsidy had increased only from 919,298 gross tons in 1880 to 1,350,562 gross tons in 1900, soon began to show substantial progress, gaining steadily from 1,350,562 gross tons in 1900 to 2,319,438 gross tons in 1914, the year of the world war.

Result Is Experienced Ship Operators and Shipbuilders

Even before the world war, France was indisputably becoming again a great maritime nation. In the four years of the world war 921,636 gross tons of French shipping were destroyed by the enemy mines and submarines. But the French system of National aid had developed excellent shipyards and a strong and capable body of merchant shipowners and operators—so that with the continued aid of the government the French merchant marine had more than made up its war losses up to a total of 3,245,194 gross tons in 1920.

That is to say, in spite of difficulties and discouragements under an improving policy of constructive National aid, the French subsidies had succeeded, as British subsidies and Japanese subsidies had succeeded, in making the French merchant flag a power on the ocean.

Those foes of National aid to shipping who had scoffed at France as an illustration of the "futility" of subsidies were utterly discomfited in the long run—precisely as had been those who in the United States fifty years ago had scoffed at any hope of success from the high protection to manufacturing, under which the United States has now become head and shoulders the greatest manufacturing nation in the world.

Now what had enabled France to realize her ambition for a merchant marine was not the subsidy alone, any more than it was the subsidy alone in the case of Great Britain or Japan. It was subsidy matched by high endeavor and sustained by the native producing and commercial resources of the nation.

An Impressive Lesson For America

These facts of recorded history have their impressive lesson for our America. National aid to shipping will succeed in the United States, as it has succeeded in Great Britain and in Japan, first because the American race, as its whole history proves, is by instinct and tradition a maritime race —judged by its achievements before 1861 the most daring and efficient maritime people the world has ever known. Moreover, the Americans, perhaps beyond all others an industrial and commercial people, are exporting today a greater bulk and value of home produced goods than any other nation—and our overseas trade is only as yet in its infancy.

There are in America the goods to carry and the genius to build and sail the ships to carry them. There is a rapidly expanding population to furnish shipbuilders and seamen to convey an ever-increasing surplus of products to foreign lands. Judging by the experience of Great Britain, of Japan and of France, the United States, once it bestows National aid on its shipping as a half century ago it bestowed most liberal National aid on its manufacturing, will succeed far beyond the measure of Great Britain or Japan or France, and will become, before many years have flown, the greatest merchant shipping power in the world, just as it will be incontestably the first and foremost of industrial and commercial nations.

Opponents Must Lack Common Sense

A few years hence there will be widespread wonder in this country that any men calling themselves Americans should have ever made the piffling objections that some of our public men are making to the enactment of President Harding's shipping bill. There will be amazement that any Senators or Representatives, even of States far inland, should have failed to visualize the tremendous opportunities which National aid to shipping opens not to shipping alone but to the manufacturing and the agriculture of America. Those who in the halls of Congress are now contending that America needs no ships and that subsidy will fail to give her ships, are going to be looked on presently like those other wiseacres who disputed with Columbus and insisted that he could not sail around the world to the Indies because the world was flat!

Let this fact be emphasized again and again, that it is only in the United States that there is any debate over National aid by subsidy or in other ways to shipping. When the British Parliament bestowed the hugest subsidy of all to the Cunard Line when it loaned twelve million dollars of money for the building of the *Mauretania* and *Lusitania* and provided a twenty-year subsidy by which the loan might be repaid, there were no protests from agricultural statesmen of the inland counties. The vote of Parliament was hearty and unanimous. Japan, since the war, has confirmed her long-time policy of shipping subsidies. France and Italy are doing the same. The Scandinavian countries are studying the best means of reinvigorating their merchant navies.

And they are all doing this without sectional or factional division. It is only in America that the appeal to sectional or party spirit is heard against National aid to the National flag in the most intensely competitive of international industries.

Anti-Subsidy Propaganda

Britons, of all kinds and degrees, as Senator Ransdell and other American public men have lately shown, are carrying on a vociferous campaign against any encouragement to American shipping. Tories, Unionists and Liberals, through their public press, are unanimous in the demand that the passage of President Harding's shipping bill must be prevented by the British government. They are appealing for the defeat of this bill to what they describe as the "pro-British party" in America. And the same spirit of violent antagonism to American aspirations on the sea apparently pervades the people and the press of all other maritime nations.

A minority report from five minority members of our House Committee on Merchant Marine and Fisheries proclaims that the proposed shipping bill will not create a great merchant shipping for America. On the contrary, all American maritime men and the Senators and Representatives from maritime States proclaim that this bill *will* create a great merchant shipping. With this informed majority of Americans, all British, Japanese and other foreign shipping men thoroughly agree. These foreign observers who know trade and who know ships are frank to confess that the American shipping bill is a tremendously formidable measure—that it will most certainly give America the mastery of the seas—and that all foreign interests must unite to obstruct and to kill the bill as soon as possible.

Generated on 2024-09-12 11:46 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

These foreign antagonists of ours see far more clearly than some of our own people that America, by her proved genius for shipbuilding and navigation, her unmatched commercial resources and geographical position, with her deep harbors fronting on the two great oceans of the world, will inevitably become the greatest of sea carriers if President Harding's plans are fulfilled by the American Congress. All the world sees this but some of our own far Southern and Western inlanders—men to whom the glorious facts of our maritime history are as if they never had been written.

Here, then, is the extraordinary situation as the time nears for active consideration of the American shipping bill—our foreign competitors frankly fearful of its enactment because they are certain that it will make America the first maritime power of the world; all Americans who know ships and sea trade absolutely agreeing with this opinion—and a minority of inlanders in our own country blindly striving to thwart America's destiny. Is not this a spectacle for gods and men!

A quarter of a century ago a similar spectacle might have been witnessed with regard to the American navy. Foreign governments frankly disapproved the building of the first White Squadron. Those foreigners objected strongly to the presence of American battleships and cruisers protecting American commerce on the highways of the world. A great many inland Americans also objected. Those first naval appropriations for a new steel fleet were passed on a narrow division, with the utmost difficulty. Yet where would we have been without this war fleet in our conflict with Spain? That was a revelation that converted the West and the South to the enthusiastic support of the American navy of today. And in the immediate future that is what our experience is going to be with the American merchant marine.

Latest Developments for American Marine Week

Prominent Speakers to Address Combined Gatherings of Maritime Associations—Model of Leviathan to Be Exhibited

As the number of days in American Marine Week, which will be celebrated at the Grand Central Palace, New York City, November 4-11, will be far too few to accommodate meetings and conventions for all the associations taking part, it is planned to hold combined gatherings at which prominent speakers will talk on the practical problems of American shipping.

Very interesting papers of this nature have been presented at the annual conventions of the National Merchant Marine Asociation in Washington and it is believed that the auditorium at the Grand Central Palace will be taxed to its capacity to accommodate all the members of the various maritime associations who will want to hear these instructive addresses.

Naval Architects' Convention November 8 and 9

Two days will be required for the reading of the technical papers at the annual meeting of the Society of Naval Architects and Marine Engineers. Professional men both here and abroad are interested in the subjects presented and the ensuing discussions because they represent the best that America has to offer in the science of naval architecture and marine engineering. The list of the papers and their authors has not as yet finally been determined but it is understood that the selection will be made about September 1.

Likewise neither the selection of the prominent speakers, who will address the practical meetings, nor their subjects can be definitely stated this month. They will include, however, prominent Government officials, Congressmen and the leaders of the maritime organizations. A number of these gentlemen have already signified their willingness to speak and the publicity value of their services to the American merchant marine cannot be over estimated.

Steamship Owners' Day

The quarterly meeting of the American Steamship Owners' Association will be held on Monday, November 6, which will be called "Steamship Owners' Day." This meeting will probably be held in the morning, as usual, and in the offices of the association, which will leave the afternoon and evening free to such of their members as care to attend the meetings at the Grand Central Palace and inspect the marine exposition.

Maritime Association

Mr. F. B. Dalzell, Jr., has been appointed chairman of a committee to represent the Maritime Association during the week. At this writing the other members of the committee have not been selected. When interviewed by a representative of Marine Engineering and Shipping Age, Mr. Dalzell stated that they expected to have a very fine exhibit in their three booths at the exposition. They will also be represented by one or more speakers.

New York Tow Boat Exchange

Mr. Dalzell, who is also connected with the New York Tow Boat Exchange, has secured from that organization the privilege of showing a valuable moving picture film of towboating in New York harbor. This film will be exhibited on several occasions during the week in the auditorium of the Grand Central Palace.

A Joint Meeting

Under the auspices of the Ocean Officers' Conference, composed of captains, mates, engineers and radio telegraphers, a joint meeting will be held in the auditorium of the Grand Central Palace. The exact date for this meeting will be announced later.

The Marine Exposition

One of the star features of the marine exposition will be a gigantic *Leviathan* exhibit, the equal of which has never been seen in this country before. Through the combined efforts of the Newport News Shipbuilding and Dry Dock Company and the American Marine Association arrangements have been made with Gimbel Brothers to exhibit the original model of the *Leviathan* at the exposition.

This model is the original model which was owned and built by the Hamburg American Line. It is said to be some 38 feet in length and without doubt it is the largest and finest ship model in the world.

Purchased by Gimbel Brothers

This model and a complete set of the original plans of the *Leviathan* were purchased in Germany by Gimbel Brothers who are the contractors for furnishing the stewards' equipment on the *Leviathan*, which is now being reconditioned at the Newport News Shipbuilding and Dry Dock Company for the United States Shipping Board.

This exhibition of the model at the Grand Central Palace, November 4-11, will be the first time it has been shown in this country. The model was recently shipped from Germany at great cost and arrived in New York on August 21, 1922. In addition to the fact that the model will show

Generated on 2024-09-12 11:25 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

all the details of construction to scale, it will be the first opportunity for the public to see what the underwater portion of the vessel really looks like.

EQUIPMENT DISPLAY

The gigantic *Leviathan* exhibit has been so planned that any concern furnishing material for the reconditioning of the ship may suitably display their part in the reconditioning of the world's greatest vessel, by exhibiting in this section.

Full particulars concerning arrangements to exhibit may be obtained from the office of the American Marine Association, Inc., 15 Park Row, New York city, telephone Barclay 5458.

TRANSPORTATION RATES.

Mr. John A. Heuse, eastern manager of the Northern Fire Apparatus Company, has been appointed chairman of the Transportation Committee. He has started negotiations with the railroad men and the Trunk Line Association to secure reduced fare rates for all the members of the various maritime associations that take part in American Marine Week.

As soon as the details of just what formalities persons coming to New York to attend any of the functions must comply with are obtained they will be published. Instructions will be given about purchasing tickets and validating the same upon arrival at New York so that a half fare reduction may be secured. It will be a big saving to those who come from a great distance if the Trunk Line Association grants permission to the railroads to sell half fare tickets from New York to the home destination and would amount to 25 per cent of the entire railroad fare.

SIGHTSEEING TRIPS.

It will also be the function of the Transportation Committee to arrange for comprehensive sightseeing excursions so that those who attend the exposition may have the opportunity of visiting all the points of special interest in and about New York.

A consolidated ticket office will be maintained at the exposition in order that all delegates may procure both railroad and Pullman tickets and make all steamboat reservations for the return trip without leaving the building.

Increased activity is being shown in requests for exhibit space at the exposition. Shipbuilders, repair and equipment companies from all sections of the United States will be represented at the show, according to present indications, and the exhibits being planned give promise of being more unusual and interesting than ever before. Steamship owners and steamship operating companies are also exhibiting a keen enthusiasm. The scope of the forthcoming exhibition is daily growing more widespread and the list of companies who will take part is being constantly added to.

The official allotment of space and booth numbers thus far made is as follows:

Booth No. 2—American Manganese Bronze Co., Holmesburg, Philadelphia, Pa.
3-6—General Electric Co., Schenectady, N. Y.
7—C. H. Wheeler Mfg. Co., Philadelphia, Pa.
8-11—Pneumercator Co., New York, N. Y.
12—Victor Eng. Co., New York, N. Y.
13—C. H. Woolsey Paint & Color Co., New York, N. Y.
15—Peabody Engineering Corp, New York, N. Y.
16—Texas Co., New York, N. Y.
17—McCormick, McPherson & Lapham, San Francisco, Cal.
19—American Steel Foundries, Chicago, Ill.
21—Ashton Valve Co., Boston, Mass.
22-24—Sperry Gyroscope Co., Brooklyn, N. Y.
25-28—Coffey Engineering Corp., New York, N. Y.
29—W. & J. Tiebout, New York, N. Y.
30—Pantasote Co., New York, N. Y.
31—Lee & Simmons, Inc., New York, N. Y.
32—Marine Review, Cleveland, O.
33—Hyde Windlass Co., Bath, Me.
34-35—Brunswick-Kroeschell Co., New Brunswick, N. J.
38—Crandall Engineering Co., East Boston, Mass.
42—The Babcock & Wilcox Co., New York, N. Y.
44—Underwood & Underwood, New York, N. Y.
45—Valentine & Co., New York, N. Y.
46—Port of New York Publicity Co., New York, N. Y.
47—Keasbey & Mattison, Ambler, Pa.
51—Marine Engineering & Shipping Age, New York, N. Y.
52—Mercantile Specialties Co., New York, N. Y.
53—Ellcon Co., New York, N. Y.
55—Northern Fire Apparatus Co., New York, N. Y.
57—Coen Company, San Francisco and New York, N. Y.
58—National Malleable Castings Co., Cleveland, O.
59—Scovill Mfg. Co., Waterbury, Conn.
60—The Griscom-Russell Co., New York, N. Y.
63—Diamond Power Specialty Corp., Detroit, Mich.
64—Asbestolith Mfg. Co., New York, N. Y.
65—Row & Davis, Engrs., Inc., New York, N. Y.
66—The Superheater Co., Chicago and New York, N. Y.
68—Crane Co., Chicago, Ill.
70—Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
71—Sterling-Cooper Corp., New York, N. Y.
72—Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
80—Newport News S. & D. D. Co., Newport News, Va.
81-82—Model of S. S. *Leviathan*.
83—Gimbel Bros., New York, N. Y.
84—Todd Shipyards Corp., New York, N. Y.
85—Westinghouse Elec. & Mfg. Co., East Pittsburgh and New York.
86—Marine News, New York, N. Y.
87—Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
88—Todd Shipyards Corp., New York, N. Y.
90—Chase Metal Works, Waterbury, Conn.
96—Marine Decking & Supply Co., Philadelphia, Pa.
99—Lunkenheimer Co., Cincinnati, O.
100—Worthington Pump & Machinery Corp., New York and Harrison, N. J.
101—Kingsbury Machine Works, Philadelphia, Pa.
107—P. S. Thorsen Co., Brooklyn, N. Y.
108—H. E. Boucher Mfg. Co., New York, N. Y.
111—B. F. Sturtevant Co., Hyde Park, Boston, Mass.
221—Masters, Mates & Pilots, New York, N. Y.
222—Ocean Assn. of Engineers, New York, N. Y.
223—Neptune Association, New York, N. Y.
224—American Bureau of Shipping, New York, N. Y.
225-227—Maritime Assn. of the Port of New York, New York, N. Y.
228—New Process Chemical Co., New York, N. Y.
229—American Society of Marine Designers, Quincy, Mass.
230—Check Room.
237-245—U. S. Navy.
246-248—Port of New York Authority.
249-270—U. S. Shipping Board.
273—Pioneer Company, New York, N. Y.
274-275—United American Lines, New York, N. Y.
277-287—U. S. Shipping Board.
288-303—U. S. Navy.
304—Crane Packing Co., Chicago, Ill.
316—Luckenbach Steamship Co., New York, N. Y.
327—Stamford Foundry Co., Stamford, Conn.
344-346—American Marine Assn., Inc., New York, N. Y.
347-349—Society of Naval Architects & Marine Engineers, New York, N. Y.

Inventor of Isherwood System Here

SIR JOSEPH W. ISHERWOOD, inventor of the Isherwood system of ship construction upon whose patent about 12,000,000 tons of vessels have been constructed, arrived in New York on the *Majestic*, August 23. Sir Joseph will remain in the United States for a month or two as he has some very important business in hand. He will undoubtedly visit a number of the prominent shipyards.

Speaking of the voyage, Sir Joseph said, "just before leaving Southampton it was found that between 30 and 40 of the studs on the rotor of one of the low pressure turbines were broken. A special staff of about half a dozen extra engineers was taken on board in addition to a superintendent and it was decided to make the repairs on the trip.

"Working under conditions of extreme heat this wonderful feat of drilling out and renewing about 40 studs 1½ inches in diameter was accomplished in 30 hours while the steamer proceeded at about 17 knots."

Generated on 2024-09-12 11:26 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Notes on Dead Freight, Detention and Demurrage

By Robert E. Annin

In this article Mr. Annin explains from a wealth of practical experience a number of the ordinary and extraordinary occurrences that are apt to prevent economy in turnaround. While the possible situations that may occur cover so wide a range that no treatise can be expected to supply a full set of precedents, nevertheless the examples given form a basis which supplemented by experience and common sense ought to be of great value in preventing the losses in ship operation that depend upon the period elapsing between a ship's entering upon and release from service.

THE chief protection against loss to the ship caused by shipper's or charterer's delay in the delivery or removal of cargo lies in the penalties known as dead freight, demurrage and detention damages. Broadly speaking, the first applies primarily to berth shipments, the second to charters and the third to special cases technically falling outside the ordinary provisions of the first two. Since delays cause irrecoverable losses to one or the other party in interest, there are no provisions of a freight contract which are more frequently the subject of acrimonious dispute and in the discussion of which novel technical positions are more frequently assumed.

The enforcement of full demurrage on the ship as a penalty for default in shipment or removal of parcel lots is of course ordinarily impracticable, since in a majority of cases the value of the cargo would be insufficient security for the demurrage claimed.

Further, to hold up an entire shipload for default on a parcel lot would be a damage to all non-defaulting shippers; and, if the ship be not actually delayed, demurrage cannot be earned.

Bill of Lading Requirements

Hence the ordinary bill of lading provisions for dead freight in case of shipper's default in delivery, and for delivery into store at cargo's risk and expense in case of failure promptly to accept and remove on discharge.

This is subject to the obligation of owner or agent to make every effort to reduce shipper's loss by filling the unused capacity in the open market. Nor may the ship take any action at port of discharge which shall cause *unnecessary* loss to the cargo owner.

To meet special conditions, special clauses are, however, often desirable on the bill of lading.

One very striking incident of this sort occurred shortly after the end of the great war. A certain shipper had made berth term engagements for full cargoes of general merchandise from the United States to Europe. No charter was made and the bill of lading contained the usual discharging clause.

Learning that the port of discharge was badly congested, the warehouses full and the wharves crowded with cargo, the carrier decided to protect himself with a special clause, fearing that such congestion, etc., might continue until the arrival of one or more of the ships. Clearly, if no warehouse or dock room, or even river or harbor craft should be available on arrival of the vessels, the carrier's right to discharge into store, etc., would be barren; and (no other recourse being stated in the contract) it might be that the consignees could use the carriers' property as a free warehouse and the latter have no remedy.

A Special Clause

To cover this possibility the following clause was inserted:

"Should consignees fail to remove cargo promptly and should storage room be unavailable, the carrier shall be entitled to damages for resulting detention to steamer, at the per diem rate of ——— U. S. gold per ton of steamer's net register; and the same shall be a lien upon the cargo until paid."

As it turned out, it was most fortunate that this precaution was taken. The port was in chaos on arrival of the ships, some of which were delayed over a month beyond a proper discharging time.

The case, however, differed from ordinary berth term shipments in that the complete cargoes were from one shipper and to one consignee. In the event of several shippers and more consignees any such clause would have been unworkable. Nor would such a provision properly fall under the head of demurrage, but rather of detention damages.

Record of Lay Days Essential

In ocean traffic demurrage is commonly to be considered in relation to voyage charters only, and since demurrage can only begin upon expiry of lay days as provided, an undisputed record of countable lay days is essential for the ship. Hence a proper charter form must clearly provide for the earliest day and hour at which days may begin to count; the exemptions (if any) agreed upon and the conditions which shall constitute a proper tender. The potential importance of an exact count from the beginning to the end of lay days is often overlooked. Let the charterer fulfil his contract by completing the loading before or by the expiration of lay days, and no question of demurrage may be brought against him. But if he delay the ship, if only by a few hours, any cause of delay developing between expiration of lay days and completion of loading, may involve a valid demurrage claim, even though the delay run to days or even weeks.

In such case the test question is apt to be—would the ship have met the delay, if the charterer had loaded her within the time granted in the charter party?

Examples That Might Result in Serious Demurrage

To illustrate,—should a ship whose days expired at noon on a Saturday be incompletely loaded at that hour, and a general dock strike develop on Saturday afternoon, the charterer would ordinarily be bound for all resultant demurrage even though the delay should be far in excess of the time required to load the ship. For the strike clause, like other exemptions of the charter party, can be claimed by charterer only during lay days.

Nor is it always possible for the charterer to accept loss by paying dead freight in lieu of completing the loading. In the case of a bulk cargo sold "10 percent more or less" it might be that the minimum quantity permitted by the contract of sale had not been loaded when the interruption occurred. The charterer would then have to choose between the payment of demurrage up to completion of loading, and jeopardizing his sale by tendering a quantity below the contract limit.

From such instances it is sufficiently obvious that demurrage and detention clauses cannot be considered too carefully, in relation to their potential relation to other charter clauses.

Tendering, Strike and Berthing Clauses

Closely related to this matter are the tendering, strike and berthing clauses. In relation to the two last, questions may

Generated on 2024-09-12 11:21 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

easily be raised in connection with conditions existing at the dock to which ship is ordered by charterer.

For the latter to select a wharf where loading was interrupted by strike, the claim benefit of the strike clause would be obviously unfair if other berths not so affected were available. Such a right if recognized would clearly be subject to grave abuse.

In such case, however, the owner or agent should refuse the berth when tendered. To accept the order to berth without demur might be considered as a waiver on the ship's part.

As a curious instance of the defenses which may be set up against demurrage, may be cited the case of a sailor in a South American port. Charter party obligated charterers to provide stiffening when and as called for by the master, as the ship could not shift or stand up without ballast. The stiffening was not provided in accord with contract terms and vessel was therefore delayed in discharging. Claim for demurrage was refused by charterers on the ground that the ship was not a good tender until discharged; that lay days could not therefore begin, and that no demurrage was due until lay days had run out. This was an ingenious method by which defendants endeavored to make their first default neutralize a subsequent delinquency.

The case was decided by awarding detention damages to the ship based on the rate of demurrage provided in charter.

An interesting detail was that charterer's agent had induced the master to sign a certificate which substantiated the charterer's claim as to days used in loading, but which the facts as established contradicted. The decision therefore supported the principle that a certificate of the master, not in accord with the facts proved or admitted, may be disregarded. But the main point decided was of course that neither party may claim benefit of a default of the other when same is directly due to his own delinquency.

Action to Reduce Losses to a Minimum Necessary

This leads to another point, not to be easily stated in a phrase, but of great influence in case of controversy.

In case of unforeseen and unforeseeable events, not specifically covered by charter provisions, the party observant must act so as to cause the least possible loss or expense to the party delinquent. As an actual incident:—

A ship, discharging at New York, had left in her 300 tons of ore, when a dispute arose resulting in the temporary holding of the ore by the carrier, as security for demurrage. The carrier had two courses.

First, to hold the cargo in the ship, charging against it the full amount of demurrage accruing day by day, or—

Second, to secure lighters and discharge into them; thus releasing the ship, and avoiding full demurrage as provided in the charter party, but making the cargo liable for lighter hire during the time that the dispute might continue. The second course was by far the less expensive, and the ship chose it.

But in the course of arbitration it developed that, had the other course been chosen, the ship could not have enforced a claim for full demurrage; on the ground that in case of default, the party observant is obliged to pursue the course obviously least damaging to the party delinquent, provided the security of the first party were not thereby impaired. In this case the security was the ore. If it could be held in barges at a cost of say $100 per day, it was the duty of the carrier so to dispose of it pending settlement; since the cost of demurrage on the ship itself would have been $750 per day.

Ready and Seaworthy

The question as to what constitutes readiness clearly has a vital effect upon possible damages for delay. Under long standing decisions of English law, it has been decided that readiness to load does not necessarily imply readiness for sea. This is also confirmed by universal practice; for few ships when tendered for loading fully meet requirements of seaworthiness as to provisions, crew and bunkers. As to engines and equipment the case is not so clear. Customarily, if a ship be tendered seaworthy as to hull, and with all holds ready to receive cargo, charterers do not object to minor repairs, not interfering with loading, whether to engines, decks or rigging. But a recent American decision held that a motor-schooner tendered on her cancelling date with engines in dismantled condition, justified charterers in cancelling the charter. Certainly in case it were doubtful whether engines could be made seaworthy by the time loading was complete, objection on the part of the charterers would seem to be justified.

Termination of Lay Days

Another question has been recently raised concerning the termination of lay days. A coal charterer, having delivered a full cargo of coal to a ship, claimed that lay days ceased with the arrival of the last coal in the hold of the ship and that time occupied in trimming was for the account of the owners. There appeared to be no precedent for this nor was the point directly covered in the charter. It had therefore to be argued from the lay day clause as written.

That clause stated: *"Cargo to be loaded at the rate of* 1,000 *tons per day;"* and the meat of the question (when it came to be considered) lay in the proper definition of the term *"loaded."*

When, therefore, is cargo loaded in the sense that the charterer's obligation in relation to lay days terminates? Charterers claimed such point to be reached when cargo was aboard ship; owners claimed that it was reached when cargo was aboard *and stowed.*

Trimming for coal is equivalent to stowage for most cargoes.

Now evidently in the case of general cargo, the "loading" is not complete either when the cargo is placed alongside ship (which constitutes *delivery* under most charters) nor even when it is taken aboard. Such cargo is only *loaded* when it is stowed and secured in the hold and the ship safe to proceed, so far as cargo is concerned. Hence, in general cargo, the term "loaded" means "put aboard and stowed."

Grain Must Be Stowed

In the case of grain, the cargo is delivered by shipper to the elevator, and the loading is by belt carrier or by gravity. The grain has to be trimmed, and a part bagged. The time required for bagging and trimming is always counted as part of the lay days in loading grain, and on the face of it, properly so. It would be a gross injustice to the ship merely to dump the grain in the holds, and claim that loading was complete. Therefore, in grain cargoes the term "loaded" means "on board and stowed." The same argument may be used in regard to lumber and other cargoes.

"But," said the charterers, "the trimming of coal is by contract paid for by the ship; and if the duty, responsibility and expense belong to the owner, the time also must be for owner's account. Also, suppose the coal lay untrimmed for a week; would that week count on lay days?"

The first of these points is covered by the analogy of general cargo, grain, and lumber. In all these articles, the cost of stowage is borne by the ship under ordinary gross form charters, but time spent in stowage counts on lay days.

The second point is only well taken in case the ship neglects, or for any reason does not use, due diligence in the trimming.

The conclusion finally reached may be summed up in the following: "and properly stowed; but the ship must use due diligence to complete stowage as promptly as possible during working hours. Any unnecessary delay in stowage or trim-

Generated on 2024-09-12 11:27 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

ming the cargo shall not count as lay days, or in demurrage, as against the charterers."

DELAYS CAUSED BY STRIKES

The so-called "Strike Clause" is likely to cause as much controversy as any other ordinary provision of a charter party. Stoppage of labor on wharves or lighters directly involved is simple enough. The term "extraordinary occurrence," which is often used, is not very conclusive; yet it is difficult to see how it can be expanded with any real advantage. What is an extraordinary occurrence? Let us say an occurrence which ordinary foresight and diligence could by no means have prevented or provided against. The Martinique volcano; the Galveston cyclone; the Great War; clearly would come under this definition; as might a disastrous fire or earthquake in New York, Norfolk, or San Francisco.

But these are all obviously extraordinary and would probably be covered by the "Act of God" etc. clause. The puzzling questions are those which come up when an occurrence is close to the line of ordinary or extraordinary; a gale in harbor; a fire or strike of limited extent but wide influence; a sudden change in law; or any other happening which one party may claim as coming within the limits of the ordinary, while the other asserts that it is in the class of the extraordinary. There seems no course here except to leave the definition open until the emergency forces a decision.

DIRECT EFFECT OF EXTRAORDINARY OCCURRENCES

This can be somewhat modified by the stipulation that such "extraordinary" occurrences must "directly" prevent the delivery, loading, or discharge, of cargo; and the effect of the word "directly" should not be overlooked. It is conceivable that a local coal strike might prevent the production of steel in certain mills; an automobile manufacturer being unable to obtain promptly steel contracted for with such mills, might be delayed in shipping an export order; and, further, transportation might be delayed by lack of coal. The result might be that a large percentage of a given cargo would be late in delivery and a ship therefore held beyond her lay days.

Clearly it would not be fair to the carrier to saddle the loss from such delay upon him.

CASES WHERE CHARTERER IS RESPONSIBLE

Again, a local strike might prevent the delivery of the special lot of coal cargo contracted for, by the date which the steamer had been chartered to fit. Here might arise a question, provided other coal of suitable quality were not available. But if such coal were obtainable *at any price* it would appear that the charterer must be held responsible. Otherwise the owner in accepting charter terms would be assuming the guarantee of contract between the charterer and supplier in which he had no interest, and of the terms of which he was ignorant.

In the list of extraordinary occurrences which might raise debatable questions, the following will be pertinent. A shipper had engaged on berth terms, thirty loads of grain for shipment by three successive freight liners. All the grain was coming down by Erie Canal from Buffalo, and ample time had been allowed for the boats to reach New York. But one week before the first lots were due to arrive, a flood caused a break in the canal, holding up the entire shipment for over ten days, and there was no available grain of similar quality in New York.

No such clause as we are now considering was included in the freight engagement, and the carrier therefore had the shipper at his mercy. The matter was amicably and equitably arranged, owing to the liberality and large mindedness of the carrier. But it is no bad guess that, under full charter terms, many owners would have exacted their pound of flesh, unless checked by some such provision as we are now considering.

EXPERIENCE BEST GUARD AGAINST THE UNEXPECTED

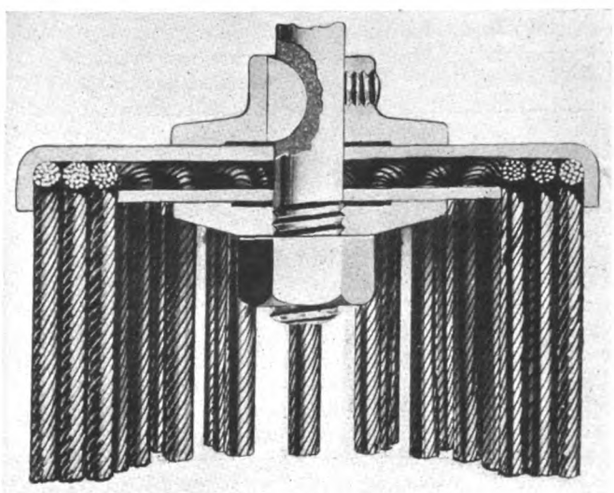
These are merely examples; and current charter forms are full of such clauses gleaned from experience. Hence it is the duty of the charterer to protect himself, by careful study of current practice, supplemented by any special experience of his own, against the unexpected and the unpredictable. Here is the great advantage of the owner or charterer experienced in certain trades. He will know of risks to be run, of contingencies to be provided against, and tricks to be dodged, which the novice (absolute or comparative) cannot possibly foresee.

Another principle which should be borne in mind is that in the absence of special covenant to the contrary, lay days always begin to count with the beginning of loading or discharging, notwithstanding any *general* provisions of charter party.

For these matters, which are of the very essence of the business, experience, aided by common sense, is the only true teacher. The possible situations have so wide a range that no records of the past can be expected to supply a full set of precedents. The vital importance of a correct estimate of the time required for a given service, is obvious in relation to arrangements of deferred business. Further, profit or loss on any gvien voyage depend largely upon the length of the period elapsing between the ship's entering upon and release from the service, since the ship's expense is in proportion to the time used. In the case of chartered ships this factor varies in importance according to the proportion of expense which the contract between the two parties imposes upon the shipowner.

Wire Brush Attachment for Air Grinders

IN ship work where the removal of rust and old paint forms a very essential operation in the repair and maintenance of practically every vessel, the new wire brush attachment for air grinders produced by the Chicago Pneumatic Tool Company, Chicago, Ill., will be found especially useful. This brush consists of three units, a ⅛-inch back plate, dished as shown in the illustration; a ⅛-inch front plate with a series of slots, and a wire brush consisting of 30 renewable units made of heat-treated crucible steel.



Wire Brush for Attachment to "Little Giant" Air Grinders

Generated on 2024-09-12 11:43 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Recent Developments in Marine Insurance

River Plate Controversy—Cargo Clause Changed Protecting the Mortgagee—Carrier's Liability to Shipper—Standard Policy

By "Bordereaux"

ONE of the outstanding features of the past month in marine insurance has been the lively controversy that has developed with respect to the River Plate clauses. There is evidence of a concerted movement on the part of the banks to force underwriters to modify these endorsements and concede coverage on goods held in the custom house awaiting assessment of duties. The clause to which so much objection is being raised reads as follows:

Including (subject to the terms of the policy) all risks covered by this policy from shippers' or manufacturers' warehouses until on board the vessel, during transshipment, if any, and from the vessel while on quays, wharves, or in sheds during the ordinary course of transit or until safely deposited in consignees' or other warehouse at destination named in policy, except that in respect to shipments to the River Plate, the risks under this insurance shall cease upon arrival at any shed (transit or otherwise), store, custom house or warehouse, or upon the expiry of ten (10) days subsequent to landing, whichever may first occur.

The reason this discrimination had to be made against shipments to the River Plate lies in the fact that fires so continually broke out at the point involving the underwriters in a disproportionate number of claims.

The position taken in the revolt of the banks is as follows: The customs regulations of Buenos Aires require that all shipments arriving in vessels from abroad shall be declared within eight days of the entry of the vessel or pay a fine of 2 percent on the customs valuations. Due to the foregoing, the merchants of that market have grown to consider this interval as a period of grace, during which time they may accept or pay the relative drafts, and many of them invariably take the full eight days. At the same time, the banks which have received the bills for collection have also been in the habit of allowing these eight days to pass before making declaration and insuring the merchandise pertaining to items not attended to. They have been led to do this from the fact that formerly the insurance policies covered the goods for more or less time after unloading and placing in the Government warehouse, usually for a period longer than eight days, but when a special qualifying clause was added to the policies because of disastrous fires which took place in deposits their custom was not altered.

Cargo is not unfrequently landed and stored in a Government warehouse for several days before expiration of the above-mentioned period, and whenever this happens the goods remain unprotected until covered by fire insurance. For the banks to cover all shipments, the documents for which pass through their hands, on the day of entry of the vessel and attempt to collect the proportionate premium from the drawee of the respective bills would probably result in much trouble and argument for them, to say nothing of losses from delays in payment or acceptance of drafts. This attitude of the Buenos Aires banks is being brought to the attention of their correspondents in this country to the end that something may be done to cover this phase of insurance; for instance, that insurance policies may be adjusted to cover at least ten days in the customs deposits there, or that instructions may be given by the insurance companies to cover goods for account from the day of the entry of the vessel.

The underwriters, on the other hand, argue that it is not unusual for goods to be held in customs at the River Plate for thirty and forty days, and that such extended risks were not contemplated by them in their rate of premium; nor do they care to encourage such unnecessary and dilatory practice by granting coverage at a higher rate, although in most cases the shipper can arrange at the time of placing his insurance for a cover of thirty days after discharge from the steamer.

There would seem to be considerable merit in the contention of the banks that the clause of the underwriters should be so worded as to grant, say, not exceeding ten days coverage in the custom house and/or on the wharf instead of making the insurance terminate as at present. Under the regular warehouse-to-warehouse clause the risk in customs is covered during any period of ordinary transit. Indeed, unless some concession is made by the underwriters, it is evident that they stand a good chance of having this business lost to the American market, as the consignee is very likely to arrange for insurance in Argentina under his open policy. A marked tendency in this very direction has been observed of late in both Argentina and Australia.

New Cargo Clause Changed

WITH the evident intention of preventing ship owners and operators from evading any part of their legal liability Clause No. 9, of the new American Institute Cargo Form 1922, has been amended with the approval of underwriters to read as follows:

"Warranted that this insurance shall not inure, directly or indirectly, to the benefit of any carrier or bailee; and warranted also that the assured has not made and will not make any waiver or special arrangement with any carrier or bailee who shall have the custody of any goods hereby insured, releasing such carrier or bailee from its or his common law or statutory liability."

Protecting the Mortgagee

AMERICAN marine underwriters have concluded that they will in the future be obliged to scrutinize their hull coverages very carefully to make sure that their own interests are protected quite as much as those of the mortgagee, especially if the appellate courts of Great Britain sustain the recent decision of Justice Greer in the case of the steamer *Ioanna*. This vessel was of Greek registry and was sunk in the Mediterranean during the epidemic of Greek total losses. In the course of subsequent litigation it was established that the vessel had been deliberately cast away and not lost through a war peril, as alleged by the owners. The underwriters on the war risk were excused from liability, but the Justice held that they were liable under marine risks for an amount equal to the mortgage on the vessel. It was held by the court that the mortgagees were not responsible for the loss, as they had not connived with the operators. To protect them, the Justice ruled that the boat was lost by the entrance of water into the hold, and that is a marine peril. Marine underwriters insist, however, that the business of insurance ought not to be saddled with fraudulent losses for the sake of mortgagees who are not parties to the insurance contract. Unless the sinking of a vessel is an act of barratry, the risk, they insist, is not covered by the marine policy.

Generated on 2024-09-12 11:26 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

In this case of the *Ioanna*, as well as that of the *Gregorios*, a similar Greek loss, the case of Small vs. the United Kingdom Company was cited as a precedent, and apparently had considerable weight with the court. In this celebrated case the vessel was deliberately cast away. The offending master was part owner, but the other owner was innocent. Suit was brought by the innocent owner and he won his case on the contention that the co-owner had committed a barratrous act. Underwriters regard this as a bad precedent to have followed in the cases above referred to. That there is a wide variance of circumstances, the following summary by Gow, in his "Sea Insurance," proves: "Interests of mortgagor and mortgagee are distinct; master who is mortgagor can commit barratry against mortgagee, provided he was not appointed by mortgagee; policy effected by mortgagor; intention to benefit mortgagee."

Dry Dock on a Rampage

DRY dock underwriters had a narrow escape from a serious loss recently when the main dry dock of the Jahncke Dry Dock and Ship Repair Company, of New Orleans, broke loose from its moorings with the steamer *Nyanza*, of the Pacific Caribbean Gulf service, in dock. Scarcely had this steamer been admitted to the dock when the latter tore away from the wharf and started on a wild rampage down the river. It made an impromptu voyage of two miles before being captured by tugs. Fortunately, the *Nyanza* had been able to slip out without damage. It was astonishing that none of the shipping in the harbor was rammed by the dock; several vessels were missed by inches.

Liability of Carrier to Shipper

IN an interesting case recently decided by the United States Circuit Court of Appeals, Second Circuit (279 Fed. Rep. 684), several involved questions arose as to who was the insured and who the insurer. The Virginia-Carolina Chemical Company brought suit against the Chesapeake Lighterage and Towing Company for the recovery of damages alleged to have been sustained in the total loss of certain merchandise of the former carried on a barge of the latter, which sank in the course of its voyage. It was alleged that when the lighterage contract was made, it was agreed that the Chesapeake company should insure all goods while on its lighters up to the sum of $6,000, "provided there was no prior insurance." As a matter of fact the Federal Insurance Company had a policy in force covering the company which sold the goods to the libelant, "on account of whom it may concern," and it concerned the libelant apparently as holder of bills of lading for the merchandise under consideration at the time it was put aboard the barge.

This insurance covered the goods from time of shipment until delivery at destination, and specifically included "all risks of lighterage;" but such general assumption was limited by the following exceptive provision:

"Warranted by the assured free from any liability for merchandise in the possession of any carrier or other bailee, who may be liable for any loss or damage thereto, and for merchandise shipped under a bill of lading containing a stipulation that the carrier may have the benefit of any insurance granted thereon, and that any insurance granted herein shall not cover where any carrier or other bailee has insurance (whether prior or subsequent in date to this policy) which would attach if this policy had not been issued."

At the time when the Chesapeake company agreed to carry the merchandise in question it had a policy in the Fireman's Fund which by its terms covered "merchandise and property on which the insured have agreed with the shippers to provide insurance, also their legal liability in cases where they have not agreed to provide insurance." And this policy, again, carried the following: "Warranted by the assured that any insurance granted herein shall not cover where the assured or any carrier or other bailee has insurance which would attach if this policy had not been issued."

When the goods at question were lost, the libelant received from the Federal Insurance Company what would have been its loss under that company's policy, but only "as a loan, and repayable only to the extent of any net recovery it may make from any carrier, bailee or others on said merchandise." The receipt for this loan contained the usual agreement on the part of the libelant to prosecute suits as required by the Federal; hence the suit against the Chesapeake company, the contention being that the policy with the Fireman's Fund made the latter liable to the libelant.

The finding of the trial court was for the libelant as against the Fireman's Fund only, but dismissed the libel as against the Chesapeake company. Whereupon the Fireman's Fund appealed. The Circuit Court of Appeals reversed the decree of the lower court, without costs, and remanded the cause, with directions to dismiss the libel, without costs. The court held that the cargo owner could not recover on such a policy for loss of cargo as "the assured," where it had other insurance, nor through liability of the ship owner where the latter was not charged with any fault—as was the case in this instance.

Standard Marine Policy Needed

CONSENSUS of opinion is slowly crystallizing around the idea of devising a standard marine insurance policy to cover all nations. It has many supporters in America, and is being actively urged in various parts of the United Kingdom. Not long ago a Liverpool newspaper approached a number of prominent marine underwriters for an expression of opinion on the plan, and they declared that among other advantages that would follow a universal adoption of such a proposition would be the doing away with a great amount of expensive and unnecessary litigation. This would especially be true were such a policy made to apply to hulls as well as cargo. One of the difficulties appears to be as to the form of policy. It has been suggested that the only way to arrive at a satisfactory result is to have a general policy for all kinds of cargoes and all kinds of hulls for all countries of the world. Two separate policies, one for hulls and one for cargoes, would entail dissatisfaction. Says one authority: "The modifications which would be absolutely necessary to suit different classes of vessels, different forms of goods, and the many different ideas of shippers as to how much they are willing to pay for the kind of insurance they want, would lead to chaos, and in all probability involve just as much litigation as the present system." The suggestion now is to have a round-table discussion between representatives of the principal countries.

Warehouse to Warehouse

SVEND ANDERSEN, general manager of a prominent Danish insurance company, has some interesting views on the joint warehouse to warehouse clause, and he expressed them frankly in an address he delivered before the recent Second Northern Marine Insurance Congress, held at Copenhagen. His conclusions, summarized, are as follows:

1. The clause must not act as a new extension of the risk, only as an extension of the ordinary conditions of the policy.
2. Fundamentally, the clause is only valid for the ordinary course of transit.
3. The underwriter should see that his risk is limited to a certain number of days after the unloading of the goods, irrespective of whether the goods within that period reach the warehouse.
4. The underwriter should never undertake to insure the

Generated on 2024-09-12 11:26 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

goods after the arrival at the consignee's warehouse, and should claim all losses notified immediately at the expiration of the risk.

5. The underwriter should, in a reasonable measure, give the insured an opportunity of being covered under deviations, against an additional premium. The insured must, however, get to know that marine insurance in essence is *uberrimæ fidei.*

6. The underwriter should use a "proof" clause for composite transports to ensure that he is not to pay for losses sustained under the preceding part of the transport, when he was not on the risk.

7. The underwriter must understand clearly that the warehouse to warehouse clause is a considerable extension of the risk, and consequently claims a big increase in the premium.

New Rivet Gun Speeds Up Rivet Passing

THE need for speed and safety in passing rivets in the shipyard led to the development by the Pennsylvania Flexible Metallic Tubing Company, Philadelphia, Pa., of a machine known as the Penflex rivet gun which is intended to deliver hot rivets from the forge to any part of the ship through a special flexible tubing. The gun comprises four heavily built parts—a compressed air tank, a head mounted on the tank into which the hot rivets are dropped, a metal delivery tubing and a receiver at the end of this tubing. The completely assembled device is shown in the illustration.

In use the gun and forge are located at the most convenient point for operation, and the tubing is led to the place where the rivets are to be driven. As each rivet is heated and ready to be passed it is set by the heater on a valve provided in an opening contained in the head of the gun. By its own weight the rivet opens this valve and enters the machine. Automatically the valve recloses and the rivet is sent through the tubing by the depression of a foot treadle. This latter operation releases the compressed air, which has been supplied to the tank, into the head of the machine and the impulse shoots the hot rivet through the tube to the receiver at the other end.

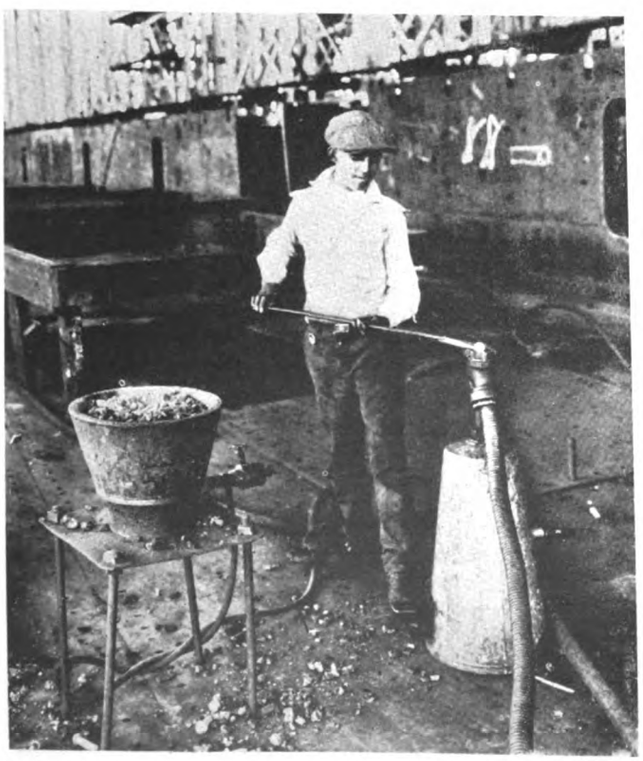


Fig. 1.—Heater Boy at New York Shipbuilding Corporation Yard Dropping Hot Rivet in Head of Penflex Rivet Gun for Delivery By Compressed Air Through Metal Tubing to Riveting Gang

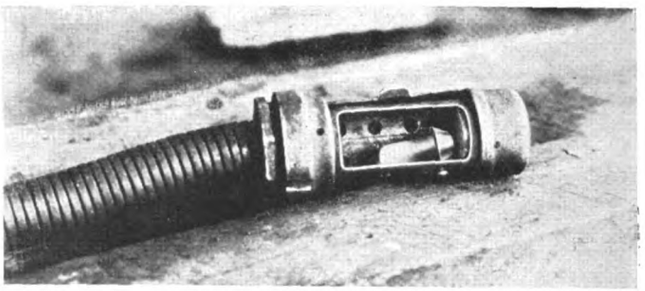


Fig. 2.—End of Metal Tubing Where Hot Rivet Is Delivered to Riveter

The standard gun has a distance capacity of 125 feet and it is stated that rivets can be delivered up or down at the rate of nearly 20 feet a second.

Corrugations are arranged in the tubing which act as a tumbling barrel and remove all hard oxide scale from the rivet so that the rivets are delivered hot free from scale.

Lehigh Car Float Launched at Baltimore

THE first of three car floats under construction at the Baltimore Dry Docks Plant, Baltimore, Md., of the Bethlehem Shipbuilding Corporation, Ltd., for the Lehigh Valley Railroad Company was launched on July 22. The float launched is the largest of the three, its principal dimensions being as follows:

Length, molded	325 feet
Breadth, molded	38 feet
Depth, molded at side	10 feet 6 inches

This float contains three tracks and has a capacity for carrying twenty loaded freight cars. It was towed from Baltimore to New York for delivery and will be used by the Lehigh Valley Railroad for conveying cars to various points in New York Harbor.

Of the two remaining floats one is 270 feet in length, 38 feet in breadth and 10 feet 6 inches in depth, while the other is 180 feet in length, 36 feet in breadth and 9 feet 6 inches in depth. All of these floats are of steel construction throughout with the exception of the deck houses which are of wood. The smallest, which is to be used in carrying refrigerator cars, has a covered platform in the center with a track on each side.

OPERATIONS OF SHIPPING BOARD VESSELS.—Chairman Lasker of the United States Shipping Board has recently made public the results from the operation of vessels for the month of June. The total expenses incurred in excess of income from vessel operations (including overhead, repairs, insurance and lay-up expenses) were $2,783,216.29. This result is almost as good as the result attained in May, which was the most favorable month under the present board in the operation of Shipping Board vessels. The corresponding excess of expenses over income for the month of May was $2,660,486.81, or a slight increase in the month of June of $122,729.48. The net excess of outlay over income on voyage operations for May (excluding overhead, repairs and insurance) was $376,445.84. In June, for the first time, income exceeded outlay, the excess of income over outlay amounting to $204,531.75. This improvement is due partly to the increase in passenger revenues, which for the month of June showed an excess of income over outlay (excluding overhead, repairs and insurance) of $354,630.78.

Generated on 2024-09-12 11:24 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Cargo Steamer Steel Traveler, of 10,050 Tons D.W.

Designed Particularly for the Handling of Long Length Cargoes Such as Steel Rails and Structural Shapes or Lumber

THE only large ocean going steel cargo vessel designed for the carriage of general cargo, now under construction in American shipyards, is the *Steel Traveler* which will be launched at the yard of the Federal Shipbuilding Company, Kearny, N. J., about September 1. The surplus of general cargo vessels owned by the Shipping Board and now tied up in various waterways has prevented any new building except where special or very efficient types were required.

Of the other vessels designed for special freight trades now under construction, the largest are the coal and ore and the oil and ore ships of 13,500 gross tons which are being built by the Bethlehem Shipbuilding Company. Freighters for service on the Great Lakes ranging from 4,900 to 8,500 gross tons are also building at the plants of the American Shipbuilding Company, the Great Lakes Engineering Company, the Manitowoc Shipbuilding Company and the Toledo Shipbuilding Company. In addition to the above-mentioned cargo ships the Bethlehem Shipbuilding Company has started work on two small freighters for the coastwise trade of the Eastern Steamship Company.

The *Steel Traveler*, although similar in design to the ten 9,600-ton deadweight freighters that have been built at the Federal Shipbuilding Company during the last three years, namely: the *Steel Worker, Steel Mariner, Steel Trader,* etc., has, nevertheless, several features incorporated in her design which will increase her efficiency over the previous vessels.

10,050-Tons Deadweight Capacity

The principal improvement is the elimination of the well aft which was made by a continuation of the bridge deck to cover the space. In this way the permissible load draft has been increased from 25 feet 10¼ inches to 27 feet and the deadweight carrying capacity from 9,380 tons to about 10,000 tons.

The vessel is a steel single screw steamship of the shelter deck type having a straight stem and an elliptical stern and it is being constructed to the highest rating of the American Bureau of Shipping, +A.1 (E). The transverse system of framing is used and there are seven watertight bulkheads, including the collision bulkhead which extends to the shelter deck and after peak bulkhead, which extends to the upper deck. There is also a longitudinal bulkhead extending from frame 104 to frame 115 dividing cargo hold No. 3 so that it may be used as a hold or ballast tank.

Accommodations

Under the steel pilot house, which contains the wheel room, chart room, wireless and battery rooms, are the captain's quarters. They consist of a stateroom, office, day room and bath which are also inclosed in a steel structure on the bridge deck. A little forward of amidships on the shelter deck are the deck officers' accommodations, including the owner's stateroom and bath. The dining saloon is located in the forward central portion of this structure with the pantry, pantry stores, dispensary stores and linen locker.

The galley is located on the same deck aft of the engine hatch in a compartment formed by a continuation of the engine casing. There are two steel houses abreast of the engine and boiler casings. The engineers are quartered in the starboard house and the petty officers in the port house. Oilers, firemen and crew are berthed in staterooms on the upper deck aft, where their mess and wash rooms are also located. The hospital, carpenter shop, store, lamp and paint rooms are situated forward on the upper deck.

Joiner Work

The pilot house and captain's quarters are sheathed with tongued and grooved cypress. Hard wood flooring is laid in the captain's rooms. The houses on the shelter deck are finished in tongued and grooved cypress with the exception of the dining saloon which is paneled in oak with white paneling overhead. The crew's quarters are also finished in tongued and grooved cypress with overhead ceiling of the same.

Brass beds are furnished for the captain, owner and chief engineer. Built-in wood berths with drawers below are fitted for the rest of the officers and wardrobes are provided in each room. The outside wood doors in the deck houses are of cypress, solid framed with solid flush panels 2½ inches in thickness.

Flooring

All rooms and passages in the officers' quarters on the shelter deck, with the exception of bathrooms, are floored with Litosilo decking 1½ inches thick. The hospital and the living and mess rooms in the crew's quarters are also floored with this material. Vitrified tiling of hexagonal shape is laid in the officers' and hospital bathroom. Linoleum ⅛-inch thick is laid in the wheel house, chart room and wireless room. Brick is used on the galley floor and both brick and tiling are laid in cement 1½ inches in thickness.

Cargo Handling

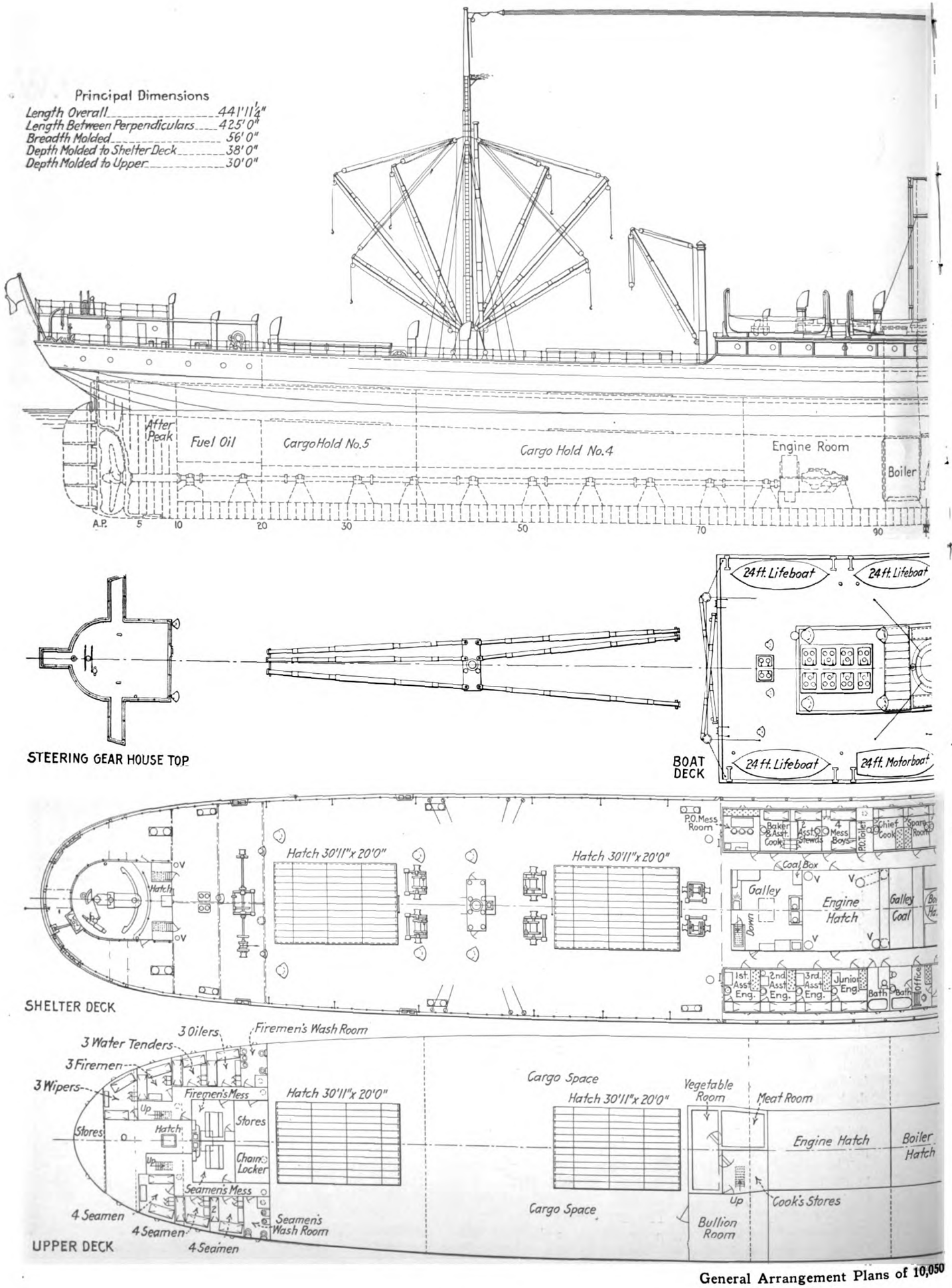
Cargo will be handled by 24 booms of long length for the particular cargo which this vessel has been designed to carry, 8 of which are 5-ton, 12 are 8-ton and 2 are 30-ton capacity. These booms are attached to 2 steel pole masts of long length and 8 tubular derrick posts. The steel derrick posts are also arranged to act as ventilators to the 'tween deck spaces and spaces below them. The five hatches are served by 8 single and 9 double geared winches so arranged that one man can handle two winches and watch his lift in the cargo holds.

Refrigerating Plant

The refrigerating machine is of the ammonia type having a capacity of 2 tons per day. The plant is required to keep the meat room at a temperature of 24 degrees and the vegetable room at 34 degrees Fahrenheit. The cold storage rooms are on the upper deck and are formed by a continuation of the engine casing. Inside the casing forming the outer walls comes a 3-inch air space, then one thickness of ⅞-inch tongued and grooved spruce, then two thicknesses of P. and B. paper, then two thicknesses of 2-inch cork, then two thicknesses of P. and B. paper, then one thickness of ⅞-inch tongued and grooved spruce, then two thicknesses of P. and B. paper, then one thickness of ⅞-inch tongued and grooved spruce, making a total of about 10 inches.

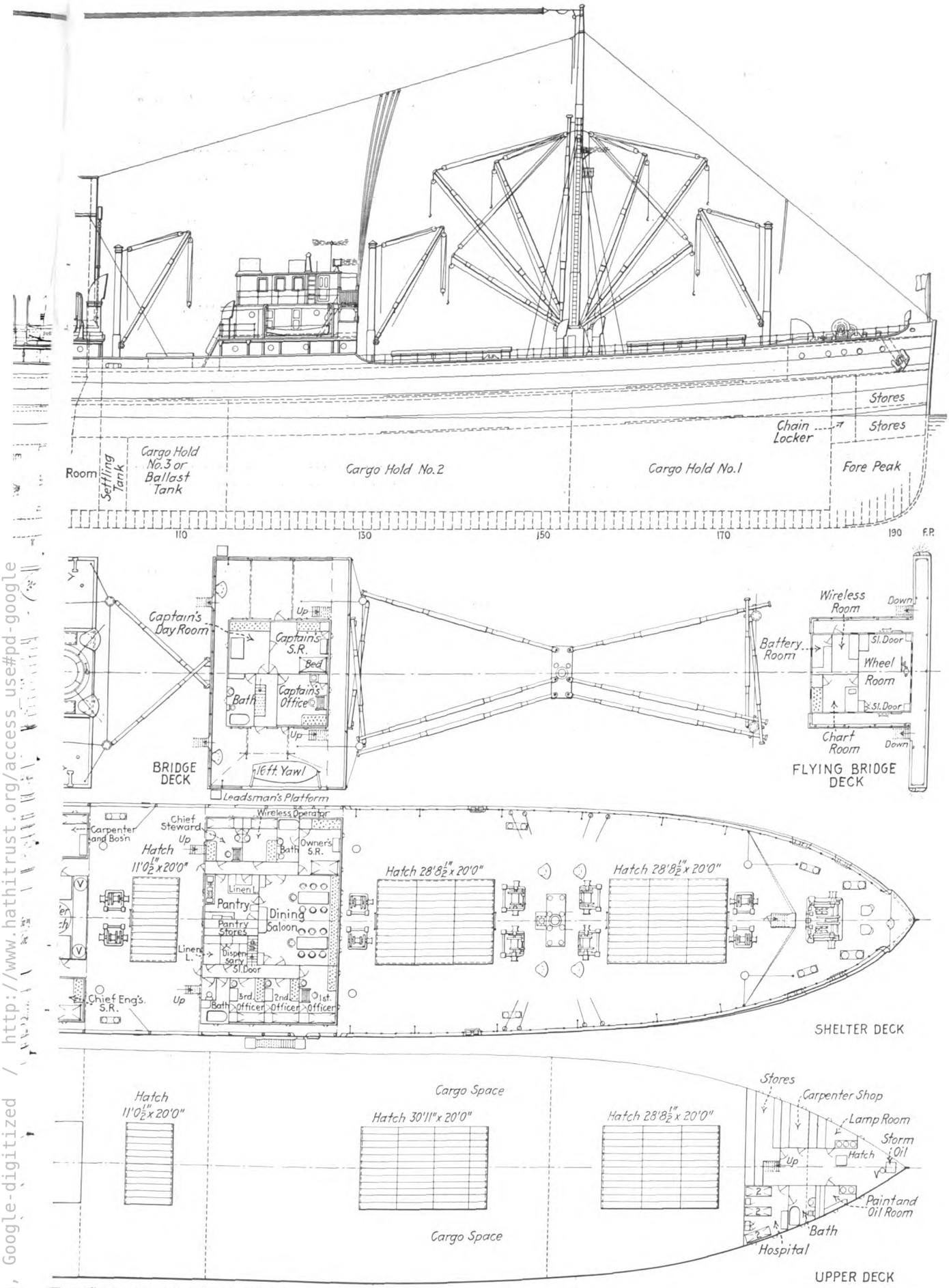
The divisional walls have first, one thickness of ⅞-inch tongued and grooved spruce, then two thicknesses of P. and B. paper, then one thickness of 2-inch cork, then one 1-inch air space, then one thickness of 2-inch cork, then two thicknesses of P. and B. paper, then one thickness of ⅞-inch tongued and grooved spruce, making a total thickness of about 7 inches.

Generated on 2024-09-12 11:23 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN



General Arrangement Plans of 10,050

Generated on 2024-09-12 11:49 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN



Ton Cargo Steamer Steel Traveler

Generated on 2024-09-12 11:24 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Cargo Steamer Steel Traveler, of 10,050 Tons D.W.

General Information

Service: .. Ocean Freight.
Builder: .. Federal Shipbuilding Company, Kearny, N. J.
Owner: ... Isthmian Steamship Lines, New York.

Characteristics

Length, overall	442'-0"
Length, B. P.	425'-0"
Breadth, molded	56'-0"
Depth, molded to bridge dk	38'-0"
Draft, loaded	27'-0"
Draft, light	
Block coefficient	
Midship section coefficient	
Longitudinal coefficient	
Speed, loaded, knots	11.5
Cruising radius, nautical miles	
Framing	Transverse
Class	+ A-1(E)

Tonnages

(In tons of 2,240 pounds)

*Weight of Hull	
**Weight Propelling Machinery	
Deadweight Capacity	10,050
Displacement	

(In tons of 100 cubic feet)

Gross register	about 7,200
Net register	about 4,400

* Weight of Hull includes Hull Proper, Hull Fittings, Equipment, and Outfit.

** Weight of Propelling Machinery includes Engines, Boilers (Wet), Shafting, Propellers, and Machinery Space Auxiliaries.

Canal Ratings

(In tons of 100 cubic feet)

	Gross	Net
Suez		
Panama		

Equipment

Anchors:	2 Stockless	8,855 lbs. each
	1 Stockless	7,525
	1 Stockless	3,185
	1 Stockless	1,320
Chain:	300 fath.	2⅜" stud link
	90 fath.	1 5/16" stud link

Rudder

Area	167.50 sq. ft.
Dia. Stock	12"
C. Press. abaft C. L. pintles	4.14'

Complement

Deck officers	4
Deck crew	16
Engineer officers	5
Engineer crew	12
Purser's and steward's department	10
Total officers and crew	47
First-class passengers	
Second-class passengers	
Third-class passengers	
Total passengers	
Total complement	

Handling Equipment

	No.	Type	Capacity	Length
Masts	2	Pole	..	86'
Derrick posts	8	Pipe	5 Ton	38'-6"
Booms	24	Steel		

Discharging Capacity: 8- 5 Ton-30' / 12- 8 Ton-50' / 2-30 Ton-55'

Deck Machinery

(Number, Size, Type)

Steering Gear	Hyde 9x12 steam tiller
Windlass.	Hyde No. 11—10"x14" spur geared
Capstans	
Winches	8—8¼x10 single geared
	9—8¼x10 double geared

Life Saving Equipment

Lifeboats	No.	Type	Length
30 person	1	Motor	24'
30 person	3	Metallic	24'
Work boat	1	Wood	16'

Propelling Machinery

Boilers

Number	3
Type	S.E. Scotch.
Length	11'-3¾"
Diameter	15'-3"
Furnaces	3 each
Fuel	Oil
Draft	Forced
Total heating surface, square feet	7,836
Total grate surface or furnace volume	
Superheat, degrees F	50°
Working pressure, lbs. sq. in	210

Normal fuel consumption:

Per day, tons	35.9
Per horsepower hour, pounds	1.08

Normal steam production:

Per hour per pound of fuel	lbs.
Total per hour	45,375 lbs.

Todd Mechanical Oil Burners

Engines

Number	1
Type	Parson's Cross Compound Turbines
Size	With double reduction gear
Horsepower	3,100 S. H. P.

Propellers

Number	1
Type	4 bladed, solid
Weight	
Diameter	17'-0"
Pitch	14'-6½"
R. P. M.	90
Projected area	
Developed area	

Auxiliary Machinery

(Number, Size, Type)

Machinery Space

Condensers, cylindrical surface 4,500 sq. ft.	28" vacuum
Evaporators	1 Reilly No. 12—25 ton/day
Distiller	1 Reilly No. 4—2,000 gal./day
Filter and feed tank	720 gal.
Feed water heater	1 Reilly No. 20
Fuel oil heaters	2 White

Pumps:

2	Main & Aux. Fd., V. S.	10x7x24
1	Aux. Air & Circ., H. S.	10x12x12x12
1	Fire & Bilge, H. D.	12x8½x12
1	Ballast, H. D.	10x10x12
1	Sanitary, H. D.	7½x5x6
1	Fresh Water, H. D.	6x4x6
1	Evap. Feed, H. D.	4½x2¾x4
2	Fuel Oil Ser., H. D.	5¼x3½x5
1	Fuel Oil Trans., H. D.	7½x6x10
1	Ice Water, H. D.	2x1¼x2¾
1	Eng. Rm. Bilge, H. D.	6x5¾x6
2	Lub. Oil, V. D.	7½x7x10
1	Lub. Oil Cooler, H. D.	7½x8½x10

Refrigerating Machinery

1 2 ton Brunswick Ammonia

Electric Equipment

Generators	2 Eng. Dr. 10 Kw. 110 V.D.C.
Radio	2 Kw.
Emergency	

Holds

No.	Length	Hatches
1	64'	20'- 8½"x20'-0"
2	84'	28'- 8½"x20'-0"
3	31'	11'- 0½"x20'-0"
4	82'	30'-11 "x20'-0"
5	40'	30'-11 "x20'-0"

Capacities

Cargo Space

Compartment	
Holds, Grain	262,850 cu. ft.
Holds, Bale	247,393 cu. ft.
Tween decks, main to upper, Grain	135,672 cu. ft.
Tween decks, main to upper, Bale	126,768 cu. ft.
Tween decks, upper to bridge, Grain	122,165 cu. ft.
Tween decks, upper to bridge, Bale	114,835 cu. ft.

Refrigerated Space

Compartment	Cu. Ft.
Vegetable	896
Meat	664

Bunkers

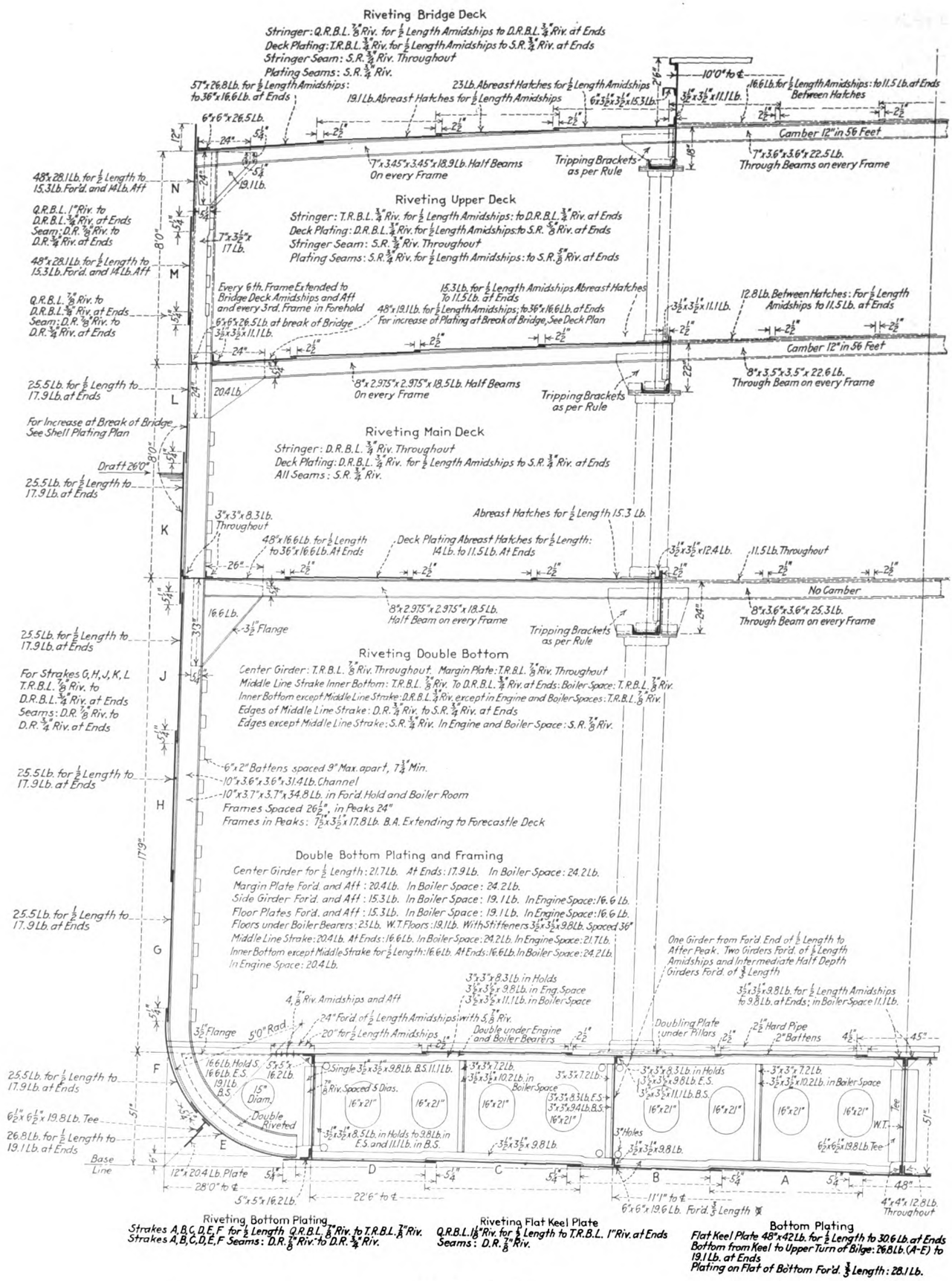
Compartment	Cu. Ft.	*Bbls.	*Tons
			2,170

*....cu. ft. per ton;.....gals, per bbl.

Tanks

Compartment	Cu. Ft.	Tons F. W.	Tons S. W.
Water		1,663 tons	
Oil			1,479 tons
Total			

Generated on 2024-09-12 11:27 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN


Riveting Bridge Deck
Stringer: Q.R.B.L. 7/8" Riv. for 1/2 Length Amidships to D.R.B.L. 3/4" Riv. at Ends
Deck Plating: T.R.B.L. 3/4" Riv. for 1/2 Length Amidships to S.R. 3/4" Riv. at Ends
Stringer Seam: S.R. 3/8" Riv. Throughout
Plating Seams: S.R. 3/4" Riv.
57"x26.8 Lb. for 1/2 Length Amidships: to 36"x16.6 Lb. at Ends
19.1 Lb. Abreast Hatches for 1/2 Length Amidships
23 Lb. Abreast Hatches for 1/2 Length Amidships
6"x3 1/2"x3 1/2"x15.3 Lb.
16.6 Lb. for 1/2 Length Amidships: to 11.5 Lb. at Ends Between Hatches
3 1/2"x3 1/2"x11.1 Lb.
10'0" to ℄
6"x6"x26.5 Lb.
Camber 12" in 56 Feet
7"x3.45"x3.45"x18.9 Lb. Half Beams On every Frame
Tripping Brackets as per Rule
7"x3.6"x3.6"x22.5 Lb. Through Beams on every Frame
48"x28.1 Lb. for 1/2 Length to 15.3 Lb. For'd. and 14 Lb. Aft
19.1 Lb.
Riveting Upper Deck
Stringer: T.R.B.L. 3/4" Riv. for 1/2 Length Amidships: to D.R.B.L. 3/4" Riv. at Ends
Deck Plating: D.R.B.L. 7/8" Riv. for 1/2 Length Amidships: to S.R. 7/8" Riv. at Ends
Stringer Seam: S.R. 3/8" Riv. Throughout
Plating Seams: S.R. 3/4" Riv. for 1/2 Length Amidships: to S.R. 5/8" Riv. at Ends
Q.R.B.L. 1" Riv. to D.R.B.L. 3/4" Riv. at Ends
Seam: D.R. 7/8" Riv. to D.R. 3/4" Riv. at Ends
7"x3 1/2"x 17 Lb.
48"x28.1 Lb. for 1/2 Length to 15.3 Lb. For'd. and 14 Lb. Aft
Every 6th. Frame Extended to Bridge Deck Amidships and Aft and every 3rd. Frame in Forehold
15.3 Lb. for 1/2 Length Amidships Abreast Hatches To 11.5 Lb. at Ends
48"x19.1 Lb. for 1/2 Length Amidships; to 36"x16.6 Lb. at Ends For increase of Plating at Break of Bridge, See Deck Plan
12.8 Lb. Between Hatches: For 1/2 Length Amidships to 11.5 Lb. at Ends
3 1/2"x3 1/2"x11.1 Lb.
6"x6"x26.5 Lb. at break of Bridge
3 1/2"x3 1/2"x11.1 Lb.
Camber 12" in 56 Feet
8"x2.975"x2.975"x18.5 Lb. Half Beams On every Frame
20.4 Lb.
Tripping Brackets as per Rule
8"x3.5"x3.5"x22.6 Lb. Through Beam on every Frame
25.5 Lb. for 1/2 Length to 17.9 Lb. at Ends
Q.R.B.L. 7/8" Riv. to D.R.B.L. 7/8" Riv. at Ends
Seam: D.R. 7/8" Riv. to D.R. 3/4" Riv. at Ends
For Increase at Break of Bridge See Shell Plating Plan
Riveting Main Deck
Stringer: D.R.B.L. 3/4" Riv. Throughout
Deck Plating: D.R.B.L. 3/4" Riv. for 1/2 Length Amidships to S.R. 3/4" Riv. at Ends
All Seams: S.R. 3/4" Riv.
Draft 26'0"
25.5 Lb. for 1/2 Length to 17.9 Lb. at Ends
3"x3"x8.3 Lb. Throughout
Abreast Hatches for 1/2 Length 15.3 Lb.
48"x16.6 Lb. for 1/2 Length to 36"x16.6 Lb. At Ends
Deck Plating Abreast Hatches for 1/2 Length: 14 Lb. to 11.5 Lb. At Ends
3 1/2"x3 1/2"x12.4 Lb.
11.5 Lb. Throughout
No Camber
8"x2.975"x2.975"x18.5 Lb. Half Beam on every Frame
16.6 Lb.
3 1/2" Flange
Tripping Brackets as per Rule
8"x3.6"x3.6"x25.3 Lb. Through Beam on every Frame
25.5 Lb. for 1/2 Length to 17.9 Lb. at Ends
Riveting Double Bottom
Center Girder: T.R.B.L. 7/8" Riv. Throughout. Margin Plate: T.R.B.L. 7/8" Riv. Throughout
Middle Line Strake Inner Bottom: T.R.B.L. 7/8" Riv. To D.R.B.L. 3/4" Riv. at Ends: Boiler Space: T.R.B.L. 7/8" Riv.
Inner Bottom except Middle Line Strake: D.R.B.L. 3/4" Riv. except in Engine and Boiler Spaces: T.R.B.L. 7/8" Riv.
Edges of Middle Line Strake: D.R. 3/4" Riv. to S.R. 3/4" Riv. at Ends
Edges except Middle Line Strake: S.R. 3/4" Riv. In Engine and Boiler Space: S.R. 7/8" Riv.
For Strakes G, H, J, K, L T.R.B.L. 7/8" Riv. to D.R.B.L. 3/4" Riv. at Ends
Seams: D.R. 7/8" Riv. to D.R. 3/4" Riv. at Ends
6"x2" Battens spaced 9" Max. apart, 7 3/4" Min.
10"x3.6"x3.6"x31.4 Lb. Channel
10"x3.7"x3.7"x34.8 Lb. in For'd. Hold and Boiler Room
Frames Spaced 26 1/2", in Peaks 24"
Frames in Peaks: 7 1/2"x3 1/2"x17.8 Lb. B.A. Extending to Forecastle Deck
25.5 Lb. for 1/2 Length to 17.9 Lb. at Ends
Double Bottom Plating and Framing
Center Girder for 1/2 Length: 21.7 Lb. At Ends: 17.9 Lb. In Boiler Space: 24.2 Lb.
Margin Plate For'd. and Aft: 20.4 Lb. In Boiler Space: 24.2 Lb.
Side Girder For'd. and Aft: 15.3 Lb. In Boiler Space: 19.1 Lb. In Engine Space: 16.6 Lb.
Floor Plates For'd. and Aft: 15.3 Lb. In Boiler Space: 19.1 Lb. In Engine Space: 16.6 Lb.
Floors under Boiler Bearers: 25 Lb. W.T. Floors: 19.1 Lb. With Stiffeners 3 1/2"x3 1/2"x9.8 Lb. Spaced 36"
Middle Line Strake: 20.4 Lb. At Ends: 16.6 Lb. In Boiler Space: 24.2 Lb. In Engine Space: 21.7 Lb.
Inner Bottom except Middle Strake for 1/2 Length: 16.6 Lb. At Ends: 16.6 Lb. In Boiler Space: 24.2 Lb. In Engine Space: 20.4 Lb.
One Girder from For'd End of 1/2 Length to After Peak. Two Girders For'd. of 1/2 Length Amidships and Intermediate Half Depth Girders For'd. of 3/4 Length
3"x3"x8.3 Lb. in Holds
3 1/2"x3 1/2"x9.8 Lb. in Eng. Space
3 1/2"x3 1/2"x11.1 Lb. in Boiler Space
3 1/2"x3 1/2"x9.8 Lb. for 1/2 Length Amidships to 9.8 Lb. at Ends; in Boiler Space 11.1 Lb.
4 7/8" Riv. Amidships and Aft
24" For'd. of 1/2 Length Amidships with 5/8" Riv.
20" for 1/2 Length Amidships
3 1/2" Flange
5'0" Rad.
Double under Engine and Boiler Bearers
Doubling Plate under Pillars
2 1/2" Hard Pipe
2" Battens
45°
16.6 Lb. Hold S. 16.6 Lb. E.S. 19.1 Lb. B.S.
5"x5"x 16.2 Lb.
15" Diam.
Double Riveted
Single 3 1/2"x3 1/2"x9.8 Lb. B.S. 11.1 Lb.
7/8" Riv. Spaced 5 Dias.
3"x3"x7.2 Lb.
3 1/2"x3 1/2"x10.2 Lb. in Boiler Space
3"x3"x8.3 Lb. E.S.
3"x3"x9.4 Lb. B.S.
3"x3"x8.3 Lb. in Holds
3 1/2"x3 1/2"x9.8 Lb. E.S.
3 1/2"x3 1/2"x11.1 Lb. B.S.
3"x3"x7.2 Lb.
3 1/2"x3 1/2"x10.2 Lb. in Boiler Space
25.5 Lb. for 1/2 Length to 17.9 Lb. at Ends
6 1/2"x6 1/2"x19.8 Lb. Tee
26.8 Lb. for 1/2 Length to 19.1 Lb. at Ends
3 1/2"x3 1/2"x8.5 Lb. in Holds to 9.8 Lb. in E.S. and 11.1 Lb. in B.S.
3 1/2"x3 1/2"x9.8 Lb.
3" Holes
3 1/2"x3 1/2"x9.8 Lb.
W.T.
6 1/2"x6 1/2"x19.8 Lb. Tee
Base Line
12"x20.4 Lb. Plate
28'0" to ℄
22'6" to ℄
11'1" to ℄
6'6" to 19.6 Lb. For'd. 1/5 Length
4"x4"x12.8 Lb. Throughout
Riveting Bottom Plating
Strakes A, B, C, D, E, F for 1/2 Length Q.R.B.L. 7/8" Riv. to T.R.B.L. 7/8" Riv.
Strakes A, B, C, D, E, F Seams: D.R. 7/8" Riv. to D.R. 3/4" Riv.
Riveting Flat Keel Plate
Q.R.B.L. 1 1/8" Riv. for 1/5 Length to T.R.B.L. 1" Riv. at Ends
Seams: D.R. 7/8" Riv.
Bottom Plating
Flat Keel Plate 48"x42 Lb. for 1/2 Length to 30.6 Lb. at Ends
Bottom from Keel to Upper Turn of Bilge: 26.8 Lb. (A-E) to 19.1 Lb. at Ends
Plating on Flat of Bottom For'd. 3/5 Length: 28.1 Lb.

Midship Section

Generated on 2024-09-12 11:24 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

VENTILATION

There is one 12-inch ventilator fitted to the store room over the forepeak. Each hold and the corresponding 'tween deck space are served with four ventilators, which are either of cowl type, 24 inches in diameter, or tubular derrick posts fitted with mushroom tops. Two 36-inch ventilators fitted with cowls are installed at the forward end of the boiler room. These ventilators may be operated from the upper platform. The engine room is served with four 24-inch ventilators, two forward and two aft, which can be worked from the upper grating. One 15-inch ventilator with cowl is fitted at the tunnel escape trunk to ventilate the shaft alley.

BOILERS

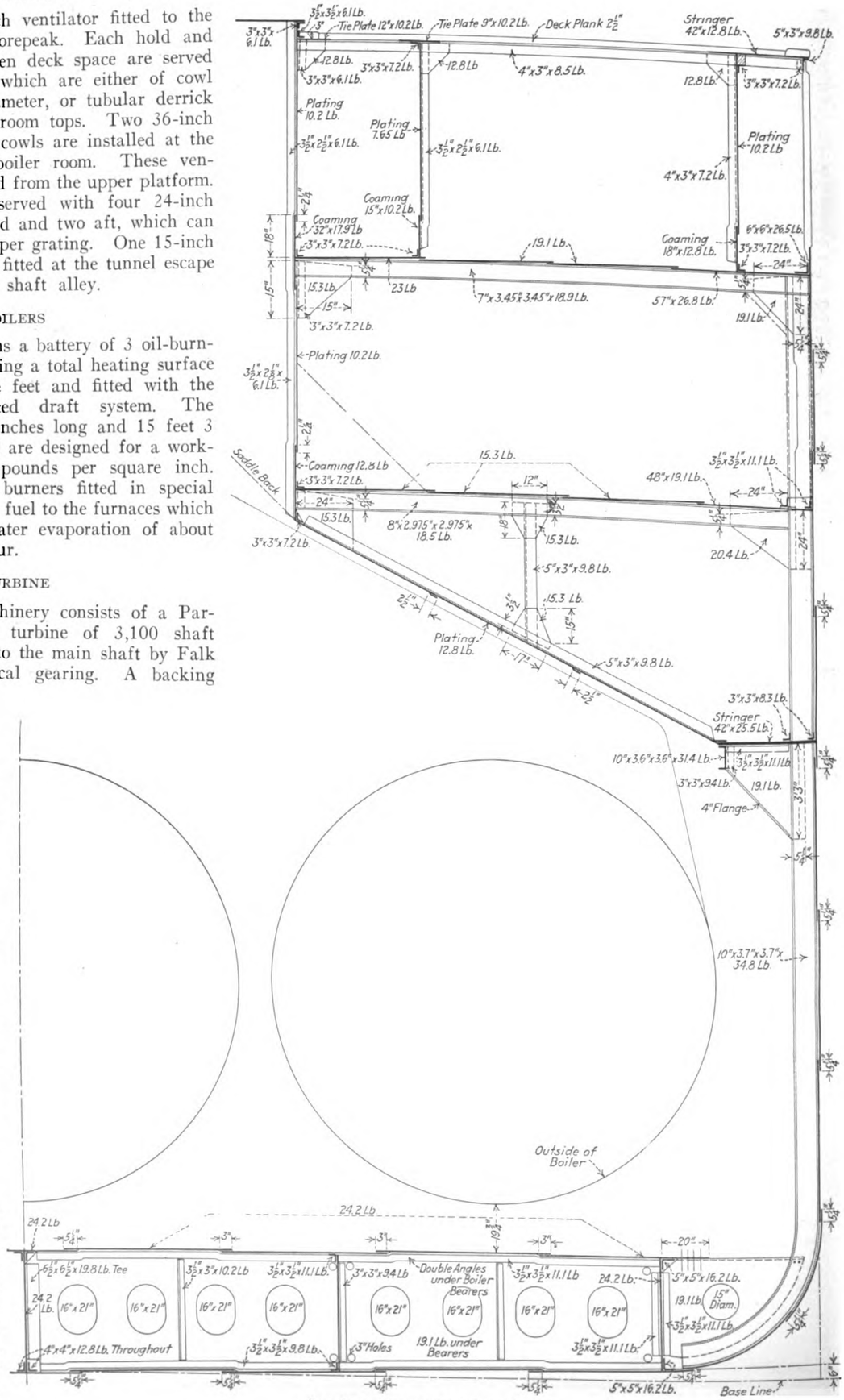
The fireroom contains a battery of 3 oil-burning Scotch boilers, having a total heating surface of about 7,836 square feet and fitted with the Howden heated forced draft system. The boilers are 11 feet 4 inches long and 15 feet 3 inches in diameter and are designed for a working pressure of 210 pounds per square inch. Todd mechanical oil burners fitted in special turret fronts supply the fuel to the furnaces which will give a normal water evaporation of about 45,000 pounds per hour.

TURBINE

The propelling machinery consists of a Parsons cross compound turbine of 3,100 shaft horsepower connected to the main shaft by Falk double reduction helical gearing. A backing turbine is incorporated in the same casing as the ahead turbine which develops 50 percent of the maximum power with the same steam flow and one-half of the ahead full speed revolutions per minute.

The lubricating oil system is of the pressure type. Oil drains from the turbine and gears to a tank of about 600 gallons capacity located in the inner bottom. From there it is pumped through two Griscom-Russell Company coolers and an Elliott duplex strainer to the turbines and gears.

The auxiliary machinery, electrical equipment, propeller data and other interesting information are listed in the accompanying data sheet and further details and the arrangement of the vessel are indicated on the drawings.



Section Through Boiler Room

Generated on 2024-09-12 11:26 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

White Star Liner Pittsburgh Has Distinctive Features

Triple Screw Vessel of Intermediate Type Built for Moderate-Rate Service—Accommodations Comparable with Those of Express Liners

DESIGNED for the Boston-Queenstown-Liverpool service of the White Star Line, the steamship *Pittsburgh,* of 16,600 tons, is an outstanding example of the modern cabin-class ship, designed to meet a demand among persons of refined and discriminating tastes for ocean travel comforts of a superior kind at reasonable cost. She is one of the finest ships afloat for moderate-rate service.

With a length of 600 feet and a beam of 67 feet 6 inches, the *Pittsburgh* has a capacity for 600 cabin passengers, besides 1,700 in third class. Her public rooms are large and handsome. She has staterooms included in suites with private baths; an abundance of outside rooms; extensive promenade decks; a large and handsome lounge; a dining room beautifully decorated and fitted, with plenty of light, and perfectly ventilated; a smoking room comparing favorably with those of the largest ships; a gymnasium equipped with a variety of modern exercising apparatus, and a special playroom for children.

Propulsion is by Triple Screws

In construction and structural fittings, the *Pittsburgh* represents the same standard as the *Olympic,* the original *de luxe* liner of the White Star Line, which was built in the same yard as the new liner, that of Harland & Wolff, at Belfast, Ireland. The *Pittsburgh's* hull is subdivided into 14 watertight compartments and there are five completely plated decks, besides a promenade deck and boat deck.

An oil-burner, the vessel is equipped with triple screws, driven by two sets of reciprocating engines for the wing propellers, and a low pressure turbine for the center propeller.

Steam is supplied at 215 pounds per square inch working pressure by six oil fired double-ended Scotch boilers working under natural draft. The high pressure four cylinder triple expansion reciprocating engines have cylinders 28, 44, 49½ and 49½ inches diameter by 54 inches stroke. The low pressure turbine is of the Parsons reaction type.

A special feature of the machinery is the electrical installation, which includes power not only for electric lights, ventilating fans and elevators, wireless, watertight doors and various forms of equipment, but also for the steering gear and winches, which are electrically operated.

Public Rooms Are Spacious

As in most liners of recent construction, the *Pittsburgh's* chief public rooms are on the upper deck, and are lofty apartments, tastefully decorated and furnished.

A central foyer leading to the public rooms is decorated in white, the only color being supplied by doors of teak and a floor of warm-colored rubber tiles. In the wall over the landing of the staircase is a large picture with a view representing a scene in Pittsburgh. The balustrading of the staircase is painted white and is surmounted by a handrail of polished wood.

The largest public apartment is the lounge, decorated in delicate straw color, relieved by moldings and wreaths of pure white. A piano, and handsome card tables are to be found here. Palms and flower stands give an inviting atmosphere to the room, the corners of which are partly enclosed by glazed screens to form cozy retreats. There is an attractive fireplace in this room.

The writing room has a paneled wall in white with delicately modeled designs, after the style of the famous Adam-Brothers. There are serviceable writing desks at various points and comfortable arm-chairs and curved seats flanking the fireplace set in a mantle of Maine marble. The furniture in this room of graceful design and pleasing color is made of birch, a characteristic American wood.

Dining and Smoking Rooms

The smoking room, in Queen Anne style, is panelled in French walnut, very simply and effectively wrought. There are ornamental stained glass windows and gilded sconces for the electric light fixtures placed in the center of various panels around the room. Chairs and seats are luxuriously upholstered in leather in a pleasing shade of blue. Ample table space is provided with groups of four chairs for card parties, if required, and isolated tables for writing purposes. The floor is covered with thick linoleum with lines of blue on a warm gray ground.

The dining room, two decks below, accommodates 400 at one sitting. It extends the full width of the ship and is fitted with tables seating two, four and six persons.

One of the distinctive apartments on the ship is the children's playroom. It is plainly paneled in oak, but enlivened by pictures illustrating the exploits of heroes and heroines of nursery legends. Toys and picture books are part of the equipment of this room.

In the gymnasium is found a chamber of old English type, with oak paneling, doors with diamond-shaped panes set in lead and equipped with iron locks, and details of finish in keeping with these features. The equipment by contrast is exceedingly modern, including apparatus for cycling, horseback riding, rowing, weight lifting, ball punching and hand ball.

Staterooms Are Attractive

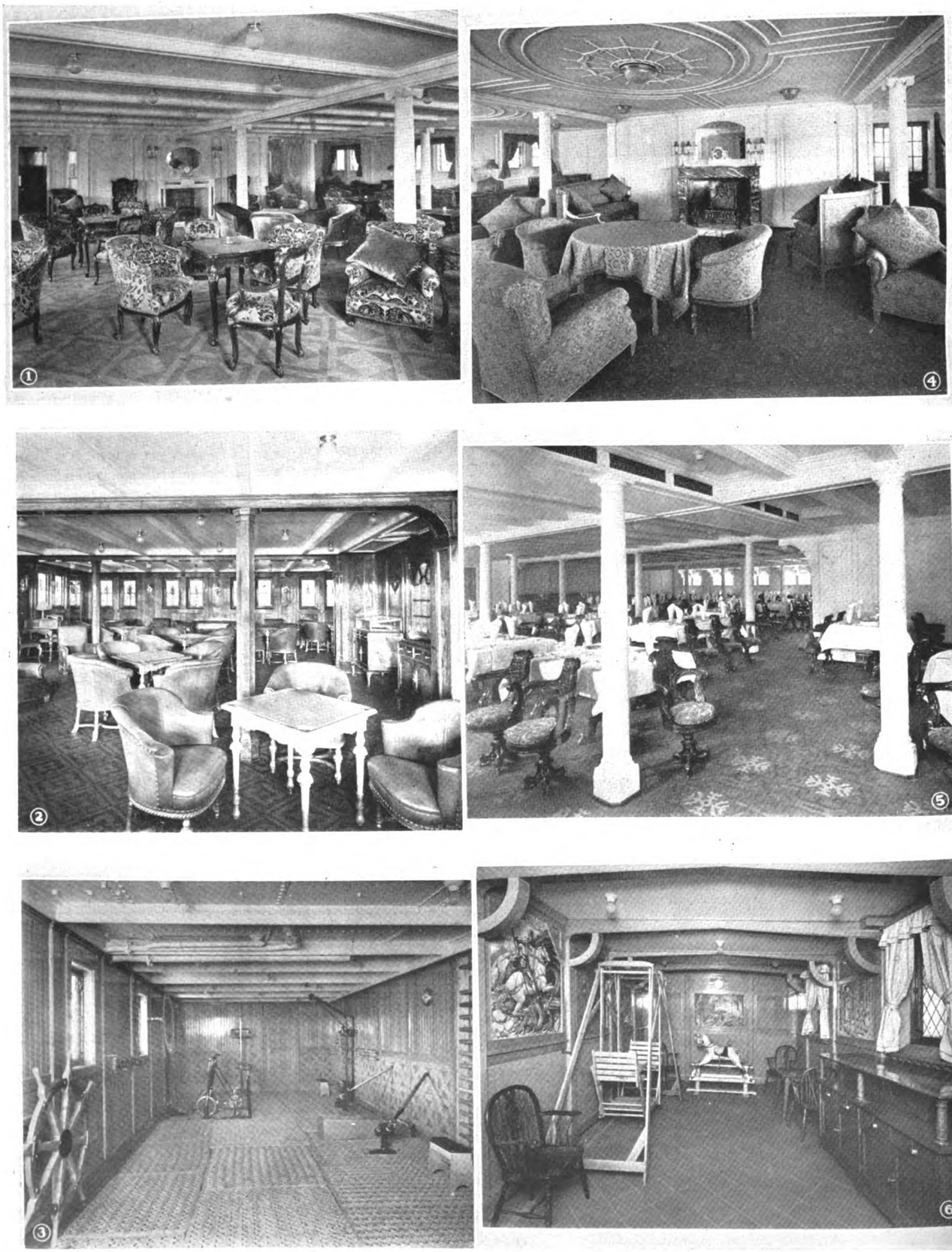
One of the *Pittsburgh's* most striking features is the variety of her staterooms, and the number which look out upon the promenade deck. Located amidship are suites which comprise one or two bedrooms, sitting room and bath room. This arrangement of apartments is an innovation for ships of the cabin class.

The sitting rooms in these suites are tastefully furnished and contain a writing table, a large lounge, a pedestal table and easy chairs. Their dimensions are 10 by 11 feet, and they have two windows looking out on deck, affording abundance of light and fresh air. The connecting bedrooms are 12 feet 6 inches by 11 feet, and each contains two bedsteads, a dressing table, wardrobe, chairs and electric heaters. The bedroom has two large windows, and off the bedroom is a white tiled bathroom with an outside window.

The remainder of the staterooms on this deck are outside rooms 9 by 11 feet, many of them connecting, furnished with four berths, thus affording desirable accommodations for families. Forward of the cabin entrance on this deck are a number of two-berth outside rooms each 6 by 10 feet, which is larger than the average stateroom.

On the upper deck are situated many two, three and four-berth rooms, including a number which are "L" shaped, having an inside dimension of 6 by 10 feet, and an extension to the outside of the ship, having an overall length of 4 feet. Many of these rooms are connected with adjacent two-berth rooms, so that if necessary individual parties may be accommodated in as many as four connecting rooms, having a total capacity of ten berths. On the same deck with these staterooms are 26 bath rooms and wash rooms.

Generated on 2024-09-12 11:46 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN



Interior Views of White Star Liner Pittsburgh: (1) Lounge, (2) Smoking Room, (3) Gymnasium, (4) Reading and Writing Room, (5) Dining Room, (6) Children's Play-Room

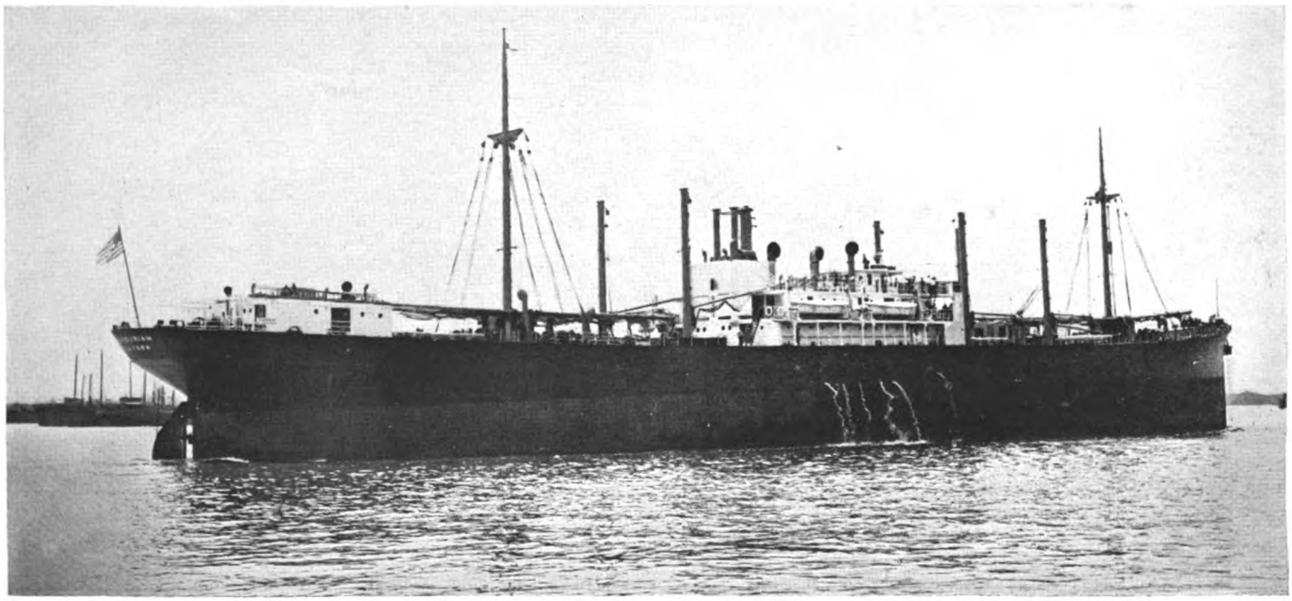
Generated on 2024-09-12 11:23 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Interior Views of White Star Liner Pittsburgh: (7) Head of Main Staircase, (8) Third-Class Four-Berth Stateroom, (9) Third-Class Dining Room, (10) Cabin Stateroom en Suite, (11) Cabin Sitting Room en Suite, (12) Third-Class Lounge

Generated on 2024-09-12 11:25 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from UNIVERSITY OF MICHIGAN



Motorship Missourian Leaving Cramp's Shipyard on July 10

Motorship Missourian Given Successful Tryout

Performance Proves That Standardization of Design and Accurate Workmanship Make It Unnecessary for a Diesel Engine to Undergo Extensive Shop Tests Before Installation in Vessel

By J. C. Shaw

ON July 6 the motorship *Missourian,* which is a sister ship of the motorship *Californian* and owned by the American-Hawaiian Steamship Company, ran her builder's trial on the Delaware, returning to the yard of the Cramp Company the same day for completion before being turned over to her owners.

The owners were in a special hurry to have the vessel, which limited the time available for dock and preliminary trials, as they were desirous of putting her on the regular sailing date, which was scheduled for leaving Boston on July 15. This haste was due to a recent decision to lay up two of their steamers for repairs which were being employed on the combined coastwise and continental service.

The engine builder's preliminary trial, accordingly, consisted of a six-hour run down the Delaware and back, or a total of 12 hours.

During the preliminary trial, revolutions and cards were taken over a six-hour continuous run.

The oil-consumption trials were run in the open sea, on the way to New York, and when running between various ports for loading.

Results of Preliminary Trial

The results of a six-hour period of preliminary trial are as follows:

Starboard engine	116.65	revolutions per minute
Port engine	114.45	revolutions per minute
Mean, both engines	115.55	revolutions per minute
Starboard engine—M. I. P.	83.34	pounds per square inch
Port engine—M. I. P.	86.19	pounds per square inch
Starboard engine	2,221	indicated horsepower
Port engine	2,258	indicated horsepower
Both engines	4,479	indicated horsepower

The shallow water, in combination with the drag of the vessel due to the trim aft, had the effect of simulating loaded conditions, as it will be noted that the engines on an average developed approximately their rated power at normal revolutions, which is 4,500 indicated horsepower at 115 revolutions per minute. At the turn where the water was deeper, however, the revolutions and corresponding power were considerably above the mean values, though the control levers on the engines were not altered.

The draft on the trial, taken in fresh water, and with the inner bottom oil tanks filled with oil and the peak tanks partly filled with water, was 8 feet 1 inch forward and 17 feet 9 inches aft, or a mean of 12 feet 11 inches, corresponding to 6,579 tons displacement.

On July 10 the *Missourian* left the Cramp Company's yard for New York to dock for bottom painting, and on the 12th proceeded to Boston to commence loading, where about 700 tons of cargo were put aboard. She then went directly to Philadelphia for additional cargo, where about 3,000 tons were taken on. Afterwards she returned to New York to finish loading. From the last mentioned place she finally sailed on July 23 for the Pacific Coast.

Much fog was encountered on the way to and from Boston, when rounding the New England coast, necessitating slowing down at times, and taking the longer outside passage, via Nantucket Light. The average speed, however, on the way up to Boston, from Ambrose to Boston Light, was 12.97 knots, and on the return from Boston Light to Overfalls (or entrance to Delaware Bay) 12.89 knots.

Oil Consumption Very Consistent

The first four columns in the accompanying table show the summary of the results obtained between the different ports before leaving for the West Coast. The data in the last column were obtained by radio on the second day out, after leaving New York for the Panama Canal. From these

Generated on 2024-09-12 11:22 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

SEA TRIALS ON MOTORSHIP MISSOURIAN, JULY, 1922

Date of trials	7/10, 11	7/12, 13	7/15, 16, 17	7/20/22	7/24-7/25
Run between	Phila.	New York	Boston	Phila.	New York
and	New York	Boston	Phila.	New York	Panama
Draft, for'd	9' 4"	7' 3"	10' 0"	13' 5"	.....
Draft, aft	16' 2"	18' 2"	17' 8"	23' 10"	.....
Draft, mean	12' 9"	12' 8½"	13' 10"	18' 7"	23' 1"
Displacement, tons	6,705	6,678	7,347	10,213	13,000
Consumption test duration	3 hrs.	2 hrs.	10 hrs.	5 hrs.	24 hrs.
R. P. M. st'b'd engine	121.64	124	121.91	114.59	.....
R. P. M. port engine	118.63	121.96	119.90	112.21	.....
R. P. M. mean	120.9	122.98	120.90	113.40	114
M. I. P. lbs., per sq. in., st'b'd engine	93.02	87.47	87.90	82.78	.....
M. I. P. lbs., per sq. in., port engine	89.04	86.33	85.62	88.18	.....
M. I. P. lbs., per sq. in, mean	91.03	86.90	86.76	85.48	85.20
I. H. P. st'b'd engine	2,588	2,477	2,450	2,170	.....
I. H. P. port engine	2,415	2,410	2,347	2,266	.....
I. H. P. two engines	5,003	4,887	4,797	4,436	4,440
Oil per I. H. P main engines, all purposes	.309	.312	.304	.306	.307
Oil per hr., lbs., all purposes	1,545	1,525	1,459	1,357	1,363
Speed trial measured between	NE Light	Ambrose	Nantucket	Overfalls	.....
and	Ambrose	Fire Isl.	NE Light	Ambrose	.....
Knots	12.45	13.93	13.27	12.42	.....
R. P. M. st'b'd engine	.....	120.84	.....	113.89	.....
R. P. M. port engine	.....	121.20	.....	111.70	.....
R. P. M. mean	115.3	121.02	121.	112.8	.....
Slip, percent	6.8	.8	6.4	5.	.....

figures it will be noted that the total oil consumption per indicated horsepower, main engines only, is very consistent and checks quite closely the results obtained with the motorship *Californian,* previously published.

The set of cards shown was obtained on the final run from Philadelphia to New York, when partly loaded. The only adjustment which had been made to the engines, affecting the character of the cards, since erection in the vessel, was to slightly advance the fuel cam throws on cylinders Nos. 2 and 4 of the port engine. The mean indicated pressures of the various cylinders had not yet been equalized, as this was to be carried out after leaving New York by the Cramp Company's guarantee engineer, Mr. O. Mattson, who accompanies the vessel on the first voyage.

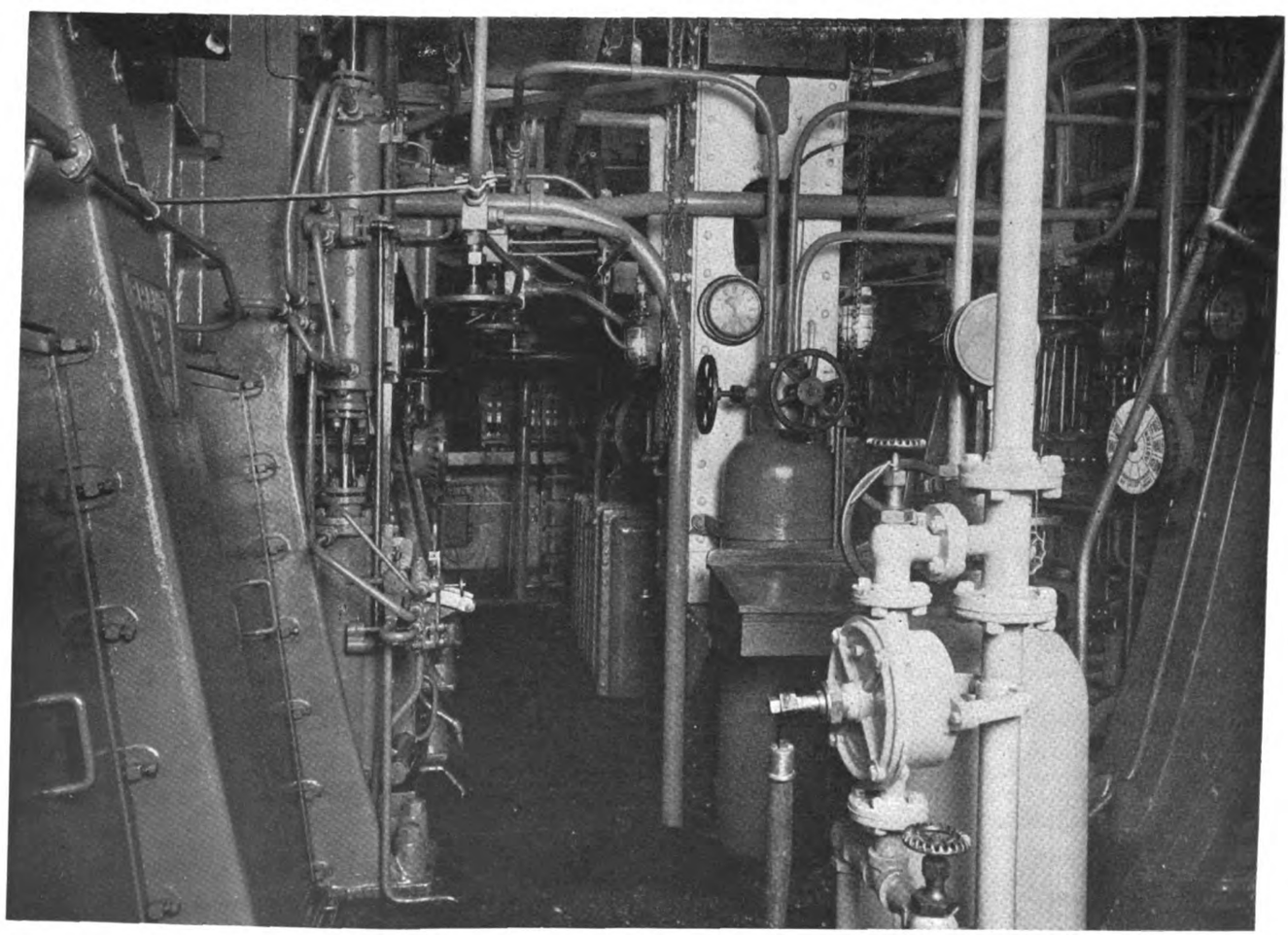
The engines were remarkably free from vibrations at all times, although the vessel was in light condition, and the revlutions of the propellers at times considerably exceeded the designed revolutions of the engines.

CARRIES OIL FOR ROUND VOYAGE

The oil, which was used on the trials, and of which sufficient is being carried for the round voyage to the Pacific Coast, returning via Panama and Europe, is the same as that furnished the motorship *Californian.* This was supplied by the Texas Company (known as Port Arthur Light Fuel), and shows the following analysis:

Specific gravity at 60 degrees F	.913
Be., corresponding	23.5 degrees
Flash, open cup	253 degrees F.
Fire	273 degrees F.
Viscosity. Saybolt universal	152
Sulphur—percent	.60
Hard asphalt, percent, insoluble in naphtha	1.11
British thermal units, higher heating value	19,120

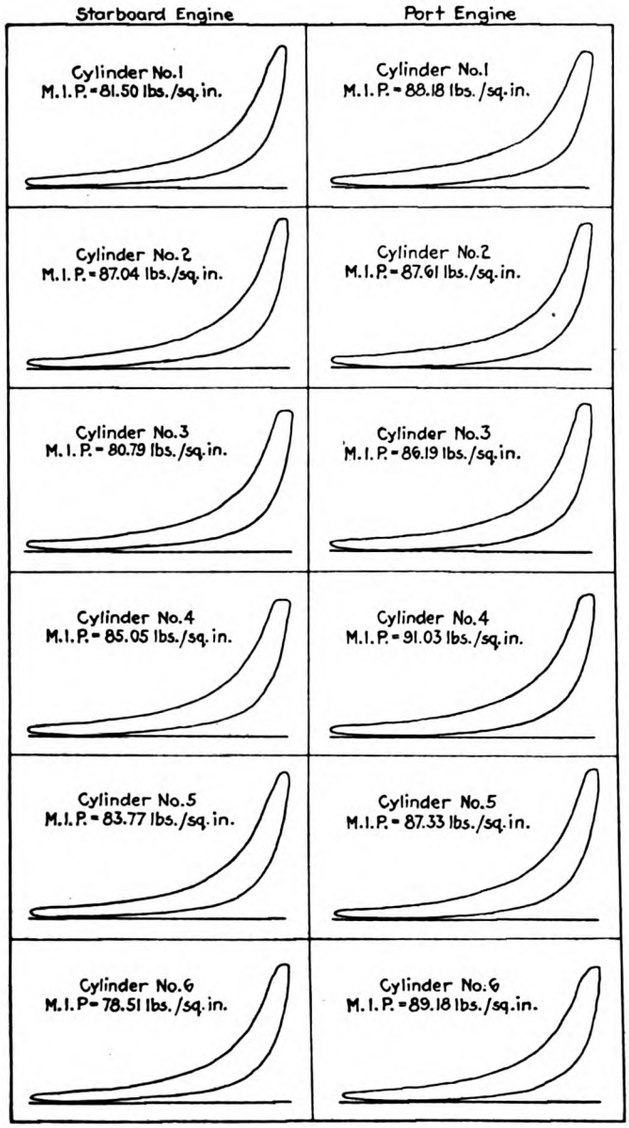
The motorship *Missourian* is identical as to hull and machinery with the motorship *Californian* with the exception of



Engine Room of Motorship Missourian, Port Side, Looking Forward, Showing Operating Platform

Generated on 2024-09-12 11:26 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

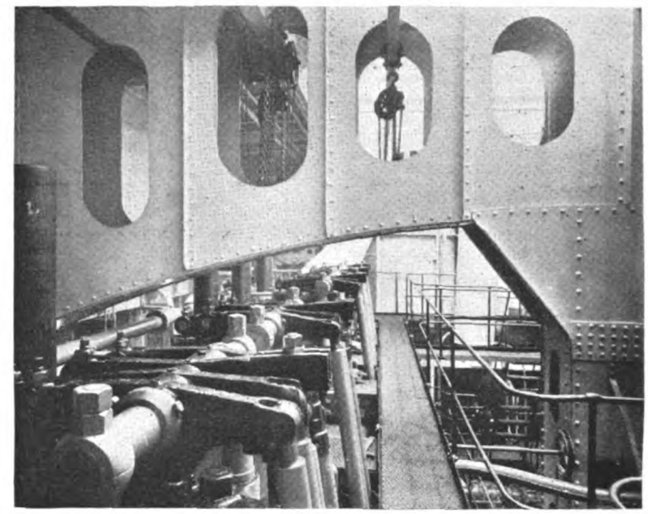
the deck machinery. The *Californian* has fourteen winches built by the American Engineering Company, and the *Missourian* fourteen winches of similar design, but supplied by the Maine Electric Company. Both vessels, however, have two winches of the Sheppard planetary gear design located at after end of No. 2 hatch. The windlass and hydro-electric steerer are the same for either vessel, being supplied by the American Engineering Company. The chief difference in the deck machinery is that the *Missourian's* electrical equipment



Indicator Cards Show Uniform Performance of Engines

was supplied by the General Electric Company, while that of her sister ship, being the same as the motorship *William Penn,* was furnished by the Westinghouse Company. In equipping the *Missourian's* deck machinery with the General Electric apparatus it was the desire of the owners to try out the equipment of these two well-known electrical companies in a competitive way, as much of the success of the motorship as a whole depends on the reliability and efficiency of the electrical accessories, and this applies to the winches in particular.

The hull of the *Missourian,* like that of the *Californian,* was built at the yard of the Merchant Shipbuilding Corporation at Chester, Pa., and towed to Cramp's yard for installation of the machinery.

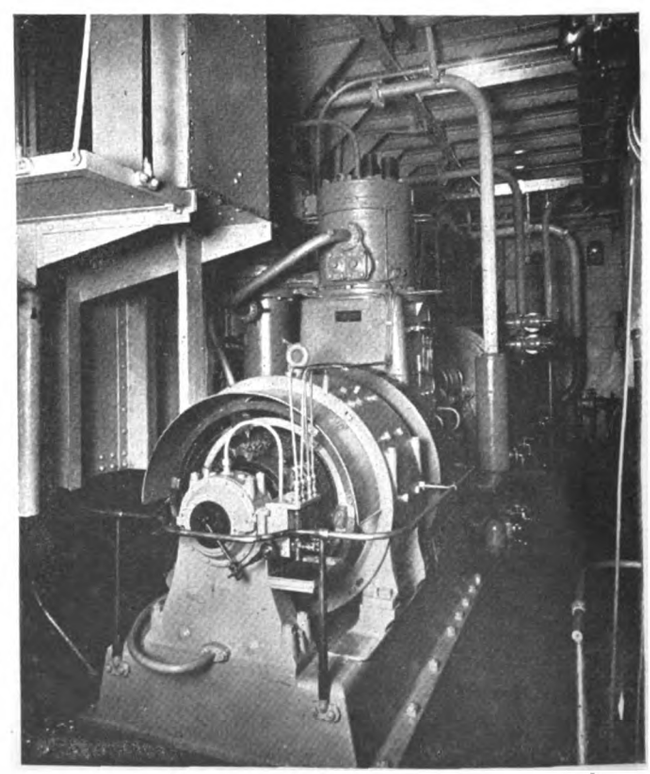


View in Engine Room at Upper Grating, Port Side, Looking Forward, Showing Cross Girder and Vertical Column

No Time Lost

The port engine was turned over for the first time under power on July 1, and the starboard engine the following day. On the 4th no work was done, it being a holiday, and on the 6th the vessel carried out her 12-hour preliminary trial, as previously stated. This is an accomplishment worthy of mention and speaks well of the standardization in design and accuracy of workmanship attained by special production methods, and completely refutes the general impression that it is necessary that a Diesel engine undergo elaborate shop tests before being installed in the vessel.

The American-Hawaiian Steamship Company has the distinction among American private shipowners of having the



Starboard Side of Engine Room, Looking Aft. Auxiliary Air Compressor in the Foreground

Generated on 2024-09-12 11:24 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

first two all-American built motorships of large size, and comparable with the motorships abroad that are being built in considerable numbers. These vessels are being run on a route, on scheduled sailings, in conjunction and in competition with their fastest and best freight steamers. American shipowners, accordingly, should follow with keen interest the performance of these motorships in service.

The master of the motorship *Missourian* is Captain R. M. Tapley, and the chief engineer Mr. Henry Timmer, both veterans in the service of the American-Hawaiian Company.

Striking Features of Motorship Building in Europe

Development of the Long-Stroke Engine—Diesel Electric Motorships—British Designers Adopting Engines to Run on Boiler Oil

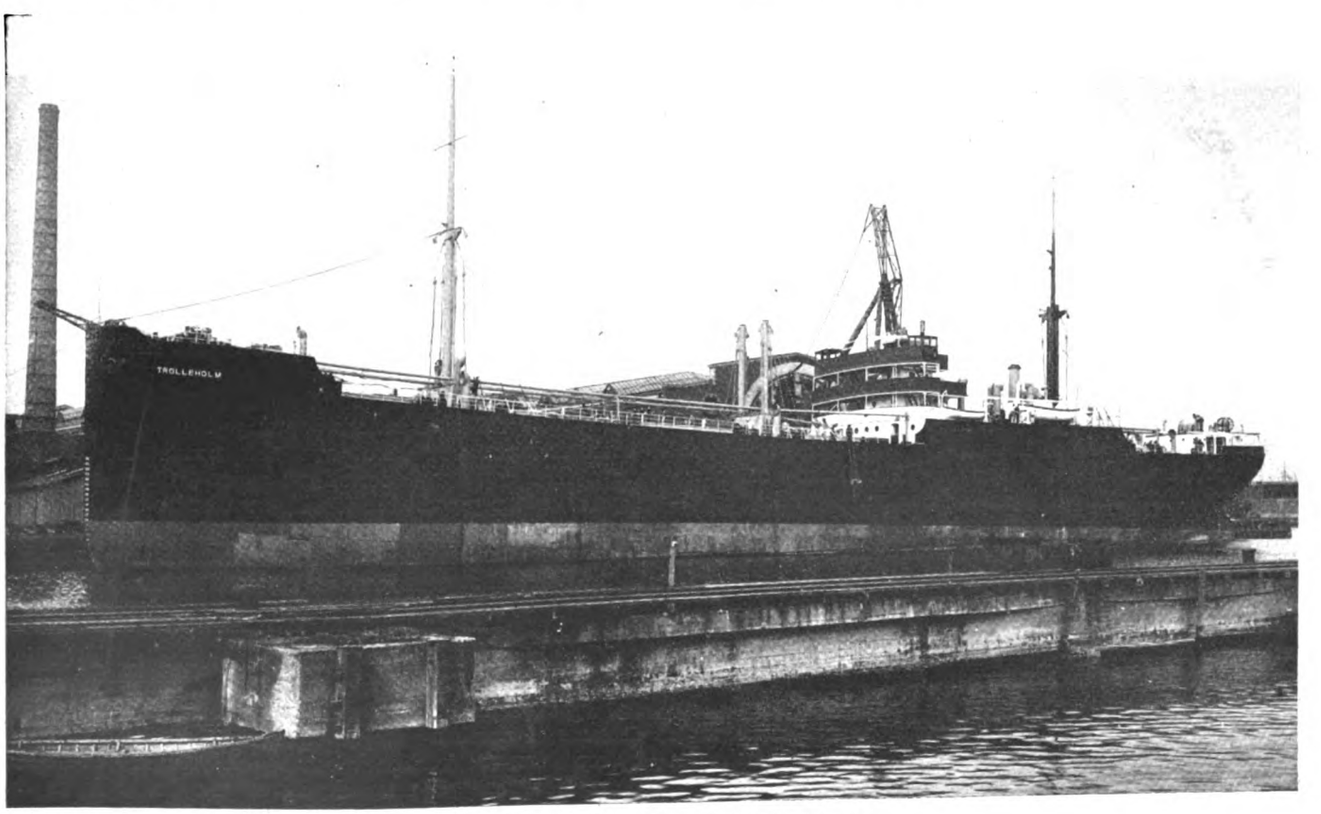
By Our Special London Correspondent

ONE of the most interesting lines of progress of marine oil engine construction in Europe during the past year, has been the development of the long-stroke motor. This is in consequence of a demand that has naturally arisen among shipowners for single screw vessels, more particularly in cases where the power of the machinery required does not exceed about 2,000 horsepower. By the adoption of this design, speeds of revolution can be kept down to a figure commensurate with those employed on single screw steamers, as the modern long-stroke Diesel engine is designed to run at about 75-90 revolutions per minute.

In spite of the depressing shipping situation, quite a number of orders for oil engined vessels have recently been placed, and among these are contracts for five ships to be provided with single screw plants. A short time ago it was considered desirable to install twin engines if only from the standpoint of reliability, but no doubt the success of the Doxford engined vessels and other single screw motor craft, has caused shipowners to change their policy in certain cases.

Hence the latest motor liner for the Holt line, which has just been laid down, and which is a 10,000 ton ship, will be equipped with the largest Burmeister & Wain long-stroke engine that has yet been built. It will develop 3,000 horsepower in eight cylinders, and run at about 85 revolutions per minute. The stroke bore ratio will be rather more than 2 instead of 1.5 to 1.6, and other new features in design will include the extension of the long vertical steel bolts to the tops of the cylinder covers, whereas in the normal arrangement, they only reach to the top of the cylinder barrels.

Another alteration lies in the adoption of a means for varying the lift of the fuel valve, according to the speed of rotation, this usually being considered unnecessary with short-stroke Burmeister & Wain engines. It will be remembered that the William Cramp & Sons' Ship and Engine Building Company is also constructing one of these long-stroke Diesel motors with the object of converting an existing steamer, and an order for three further ships has recently been placed on the Clyde for which Messrs. J. G. Kincaid and Company will supply the machinery.



The New 7,500-Ton Motorship Trolleholm

Generated on 2024-09-12 11:22 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

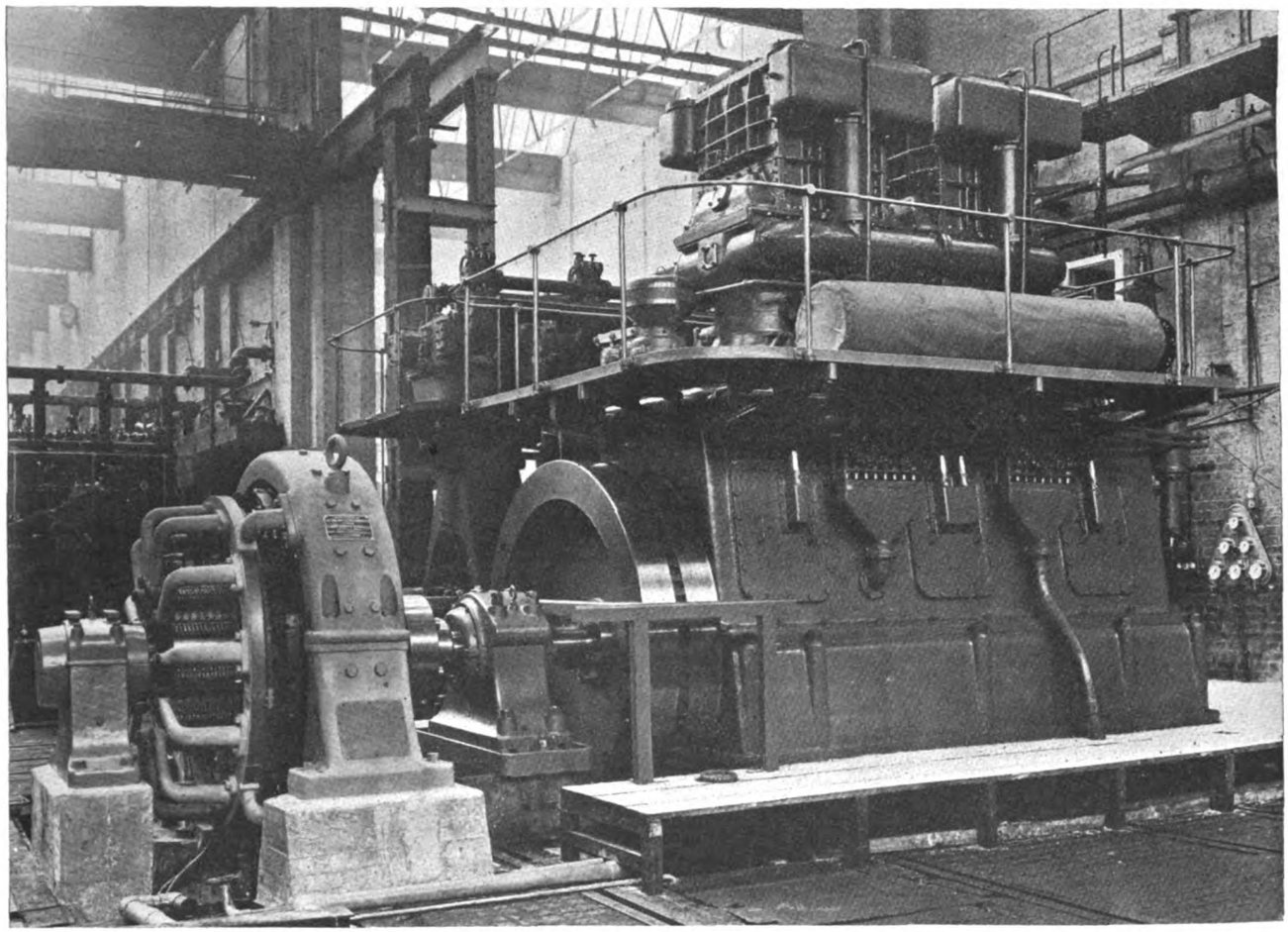
DIESEL ELECTRIC MOTORSHIPS

As a marine engineering proposition, the propulsion of ships on the Diesel electric system is of unusual interest. Messrs. Cammell Laird and Company, which has developed the Camellaird Fullagar engine with opposed pistons, has taken up the problem of the Diesel electric drive, and has received an order for three ships embodying this system, for the United Fruit Company. There will be no fewer than four generating sets installed in the engine-room, developing a total of 3,400 brake horsepower and the electric motors will drive the propellers direct at a relatively low speed. The engines will not differ from the Camellaird Fullagar marine design which is now so well-known, except in certain details, but they will operate at much higher speeds, probably at about 250 revolutions per minute.

One of the licensees of Messrs. Cammell Laird and Company, the English Electric Company, has already developed a stationary Camellaird Fullagar engine, of which an illustration is published, and the sets installed in the new ships will not show any marked variation from this construction, although they will be of somewhat higher power. A specially sensitive governor is provided, and the somewhat peculiar features of the Camellaird Fullagar marine engine will be embodied, including a square section scavenging pump, arranged at the top of each cylinder. The absence of reversing mechanism will of course render the design very simple and it is believed that in spite of the electrical gear, a considerable reduction of weight will be effected as compared with an ordinary marine equipment.

The reductions in the prices of liquid fuel at British ports, which have recently been announced, will undoubtedly give a fillip to the motorship industry. Diesel oil is quoted at £4 per ton at British ports, and boiler fuel at £3 per ton, and it is evident that, especially for those motorships equipped with machinery which can operate on the heavier and cheaper oils, the possibilities of effective competition by steamers are remote. Hence, it is not surprising that builders of marine oil engines are making every endeavor to design their motors so that they will operate satisfactorily and continuously on the low grade fuel.

The performance of one of the Doxford engined ships, the *Dominion Miller,* is interesting in this connection. On a long run at a speed of 11½ knots, boiler oil was used exclusively, the amount consumed being 10½ tons daily for a vessel with a deadweight of between 9,000 and 10,000 tons. No special precautions appear to have been taken except that heating coils are provided to render the oil sufficiently liquid to flow under all conditions. Obviously if one type of engine proves that it will burn boiler oil with complete satisfaction, makers of other designs will have to guarantee equal performance for their motors, since the saving in the fuel bill at present prices amounts to quite 30 percent.



The Camellaird-Fullagar Diesel Generating Set. Four Units are To be Installed in Motorships for the United Fruit Company

THE MOTORSHIP "TROLLEHOLM"

Motorship building in Scandinavia seems to be boiling itself down to the development of a limited number of standard types, since both shipowners and engine builders are desirous of obtaining the advantages which can be derived by repetition construction in marine oil engines. The latest example of one of these classes of standard ship is the *Trolleholm* built for the Swedish American Mexico Line and engined by Burmeister & Wain.

Generated on 2024-09-12 11:32 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

She has a deadweight of about 7,500 tons, is 367 feet in length between perpendiculars with a molded breadth of 51 feet 3 inches and a draft of 24 feet 8½ inches. Two engines are installed, totalling 2,100 indicated horsepower, the speed of rotation being unusually high, namely 150 revolutions per minute. This class of ship appears to have given very satisfactory service, since when fully laden and averaging 10½ knots, the total consumption does not exceed 8 tons for all purposes. The usual electrical equipment is provided, the donkey boiler being only used for heating purposes. Ten three-ton winches are fitted, and the steering gear and engine-room auxiliaries are driven by electric motors.

Stability of Ships at Large Angles of Inclination*

Explanation of Matrosov's Stability Calculations—Application to Lumber Carrying Steamer—By Tabulation, Work Is Reduced to Simple Arithmetic

By P. Jankov

IT is generally considered that stability calculations for "small angles of inclination" hold good for angles up to 10 degrees, but when a ship is inclined to such an angle that the side of the weather deck becomes immersed, the volumes of the "in" and "out" wedges become different,

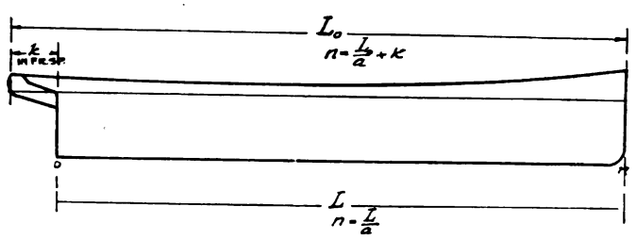


Fig. 1

and the displacement becomes greater or less depending on whether the "in" or the "out" wedge, respectively, becomes greater and the other wedge less. The change in the volume of the submerged hull is accompanied by a change in the location of the center of buoyancy C_o. Thus the

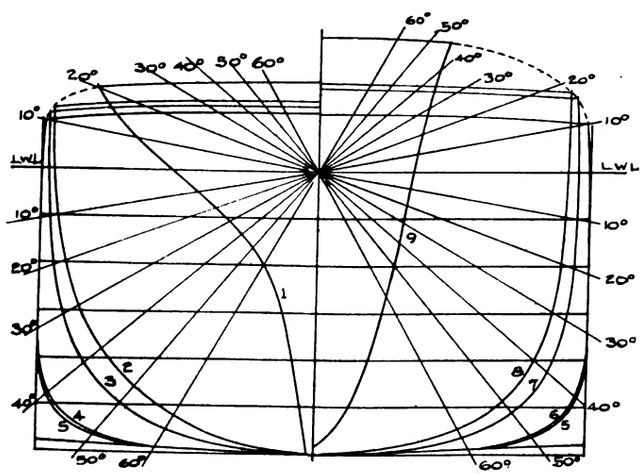


Fig. 2

distance between C_o and the center of gravity of the ship G_o is also changed. The change in the area of the load water plane affects the position of the metacenter M_o in one direction or the other. In brief, the relative locations of all the three significant points change when the angle of inclination becomes great.

To estimate the stability of the ship at greater angles of inclination according to the methods ordinarily in use, it is necessary to perform numerous long and laborious calculations, and this work is further increased if it is desired to find the stability for several different conditions of loading. But great saving of time is effected by using the method described below, the development of which is credited to A. Matrosov, a Russian naval architect, and which is said to have been in use in all the larger Russian shipyards. The procedure is exceedingly simple and, if the work is

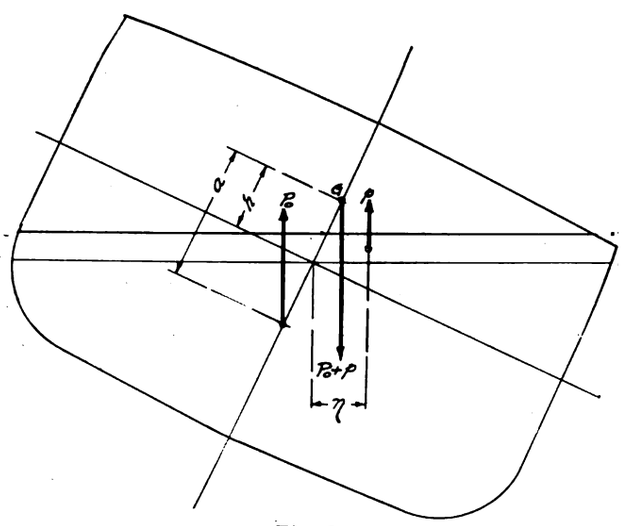


Fig. 3

tabulated as here indicated, it becomes reduced to simple arithmetic.

Matrosov's method for calculating stability is especially valuable for ships intended to carry lumber cargoes, since the stability calculations for the normal load waterline will not apply when the ship is loaded to the smaller freeboard permissible in many trades in lumber, especially when a deckload is carried. For this reason Matrosov's method is here explained using as an example a lumber-carrying steamer of 3,323 tons displacement at 18 feet 6 inches draft, the length being 240 feet. There are 128 frame spaces of 1.875 feet each.

MATROSOV'S METHOD

The center of gravity of the ship G_o is found by trial, after which the lever arms for different angles of inclination may readily be calculated by means of Table VII, and the static stability diagram may be drawn.

For these calculations it is necessary to have a line drawing of the ship and to know the displacement P_o or the draft

*Translated from Teknisk Ukeblad by John Flodin.

Generated on 2024-09-12 11:27 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

TABLE I

I	II	III	IV
No OF SECTION	ABSCISSAE FOR TCHEBYCHEFF'S SECTIONS FROM A.P.	ABSCISSAE IN FRAMES P. = II x n	ABSCISSAE IN FEET FROM A.P. = $\frac{L}{n}$ (III-K)
1	0.444	5.6	10.5
2	0.200	25.6	48.0
3	0.236	30.2	56.6
4	0.416	53.3	100.0
5	0.500	64.0	120.0
6	0.584	74.7	140.0
7	0.764	97.8	183.4
8	0.800	102.4	192.0
9	0.956	122.4	229.5

TABLE A

SEC'N No.	7WL	6WL	5WL	4WL	3WL	2WL	1WL	
1	9.60	6.00	3.40	2.20	1.50	0.90	0.40	
2	17.20	16.90	16.30	15.30	13.50	10.10	3.00	
3	17.60	17.40	17.10	16.50	15.20	12.40	5.00	
4	17.90	17.95	18.00	18.00	17.85	16.80	10.00	
5	17.90	17.95	18.00	18.00	17.95	17.10	10.00	
6	17.90	17.95	18.00	18.00	17.90	16.80	10.00	
7	17.20	17.10	17.00	16.60	15.80	13.60	7.00	
8	16.50	16.35	16.10	15.60	14.50	12.10	5.50	
9	6.30	5.70	5.10	4.30	3.40	2.25	0	
	138.10	133.30	129.00	124.50	117.60	102.05	50.90	
	$\frac{1}{2}$	2	1	2	1	2	$\frac{1}{2}$	
	69.05	266.60	129.00	249.00	117.60	204.10	25.45	Σ_o=1060.8
	6	5	4	3	2	1	0	
	414.3	1333.0	516.0	747.0	235.2	204.1	0	M_o=3449.6

$$C_o = \frac{M_o h}{\Sigma_o} = \frac{3449.6}{1060.8} \times \frac{18.5}{6} = 10'.03$$

$$P_o = 2 \cdot \frac{2}{3} \cdot \frac{H_o}{6} \cdot \frac{L}{9} \cdot \Sigma_o : 35 = \frac{2}{81} \cdot \frac{18.5 \times 240 \times 1060.8}{35} = 3323 \text{ tons}$$

TABLE VII

FOR LUMBER CARGO: H = 18'-6" + 7" = 19'.08

P_1=3445; c_1=10.34; g_1=14.34; p_1=122; a_1=4.00; h_1=−4.16

I $P_o a_1 \sin\varphi$	II $(M-n)^*-I$	III $h_1 \sin\varphi$	IV $\eta - III$	V $IV \times p_1$	VI $II + V$	VII $VI \div P_1$ = ARM IN FT.	$\varphi°$
2307	1148	−0.72	0.88	107	1255	0.36	10
4545	1920	−1.42	−0.57	− 70	1850	0.54	20
6640	1750	−2.08	−2.17	−265	1485	0.43	30
8540	1075	−2.68	−3.01	−367	708	0.21	40
10180	330	−3.19	−2.99	−365	− 35	−0.01	50
11510	− 580	−3.60	−2.60	−317	− 897	−0.26	60

TABLE VIII

FOR N. ATLANTIC, WINTER: H = 18'-6"−2" = 18'.33

P_2=3288; c_2=9.94; g_2=13.5; p_2=35; a_2=3.56; h_2=−5.00

I $P_o a_2 \sin\varphi$	II $(M-n)^*-I$	III $h_2 \sin\varphi$	IV $\eta - III$	V $IV - p_2$	VI $II + V$	VII $VI - P_2$ = ARM IN FT.
2052	1403	− 0.87	1.03	− 36	1367	0.42
4045	2420	− 1.71	− 0.28	10	2430	0.74
5915	2475	− 2.50	− 1.75	61	2536	0.77
7605	2010	− 3.21	− 2.48	87	2097	0.64
9060	1450	− 3.83	− 2.35	82	1532	0.47
10250	680	− 4.33	− 1.87	65	745	0.23

*(M-n) From col. II. Table VI

H_o. Before column III, Table I, is filled in, which column gives the locations of Tchebycheff's sections, it is necessary carefully to choose the length of the ship (see Fig. 1), which is given by the number of frames and distance between frames ($n = L_o/a$, where a is the length of the frame space).* This is necessary because the length of L_o is not necessarily equal to the length between perpendiculars, so that a correction k may have to be made (e. g., for a ship with a long cruiser stern).

The length decided on is multiplied by the coefficients given in Column II, which are the abscissæ corresponding to Tchebycheff's sections, expressed in thousandths of the length of the ship, from the after perpendicular. Column IV gives these abscissæ in feet.

From the lines are worked up the sections for Tchebycheff's rule (see Fig. 2), nine half-sections to a ½-inch scale in general being satisfactory. All the sections must be closed by drawing in the line of the uppermost watertight deck. Now the four fundamental quantities are taken off the lines for each condition of loading, such as full load, ballast and other conditions, and are entered in their proper positions in the tables, namely, the displacement P_o, the height of the center of buoyancy C_o, and the length L_o at draft H_o. In case only the draft is known, the displacement P_o and the position of the center of buoyancy may be found as indicated in Table A, where the summation is done by means of Simpson's and Tchebycheff's rules. From this table the displacement curve may be drawn up in the ordinary manner.

On the body plan giving Tchebycheff's sections, waterlines for inclinations for every tenth degree up to 60 degrees (continuation of this work up to 90 degrees is of no practical value) are now drawn through the intersection of the normal load waterline and the center line, which brings us to Table II. This table is divided in an upper and a lower part, the upper part containing the ordinates of the water planes for the various inclinations, the squares and cubes of the ordinates and the sums of the vertical columns for the immersing side of the ship; while the lower part of the table gives the corresponding values for the emerging side. The ordinates are scaled off the body plan (Fig. 2), in general, sufficient accuracy is obtained, if the ordinates are read to one decimal place, their squares entered in whole numbers only and their cubes to the nearest ten.

In connection with Table III attention should be called to the fact that columns IV, IX and X are used for calculating the principal moment M, while the other columns serve for estimating relatively minor moments n, the computing of which does not require so high a degree of accuracy. Columns II and IV contain, respectively, the sums of Σy and Σy^3 from the upper and lower parts of Table II, and column III gives the difference $\Sigma y_1^2 - \Sigma y_2^2$ from Table II. Column V contains the products of the values in column II multiplied by $\lambda = L_o/a$, giving areas of the water planes.

Of course, the water plane areas as found do not check with the actual values, since the water planes do not have a common point of intersection. On account of the difference between the volumes of the emerging and immersing wedges, the actual water planes will lie above or below and be greater or less than those drawn; but the error in the areas of the water planes may be disregarded without undue sacrifice of accuracy. Column VI gives the static moments of the water planes with reference to an axis that coincides with the intersection of the load waterline and the longitudinal

*This is based on uniform frame spacing. Where frame spacing is not uniform, the method should be modified to suit conditions.—Translator.

Generated on 2024-09-12 11:26 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

TABLE II

		0°			10°			20°			30°			40°			50°			60°		
IMMERSING SIDE OF HULL	NO. SEC.	y_1	y_1^2	y_1^3	y_1	y_1^2	y_1^3	y_1	y_1^2	y_1^3	y_1	y_1^2	y_1^3	y_1	y_1^2	y_1^3	y_1	y_1^2	y_1^3	y_1	y_1^2	y_1^3
	1	9.6	92	885	12.3	151	1860	15.3	234	3580	11.6	135	1560	9.2	85	779	7.7	59	457	6.8	46	314
	2	17.2	296	5090	17.6	310	5450	12.8	164	2100	9.0	81	729	7.1	50	358	5.9	35	205	5.3	28	149
	3	17.6	310	5450	17.8	317	5640	12.3	151	1860	8.6	74	636	6.8	46	314	5.7	32	185	5.0	25	125
	4	17.9	320	5740	18.1	328	5930	10.8	117	1260	7.6	58	439	6.0	36	216	5.0	25	125	4.5	20	91
	5	17.9	320	5740	18.1	328	5930	10.8	117	1260	7.6	58	439	6.0	36	216	5.0	25	125	4.5	20	91
	6	17.9	320	5740	18.1	328	5930	10.8	117	1260	7.6	58	439	6.0	36	216	5.0	25	125	4.5	20	91
	7	17.0	289	4910	17.3	299	5180	15.2	231	3510	10.8	117	1260	8.5	72	614	7.2	52	373	6.4	41	262
	8	16.5	272	4490	16.8	282	4740	16.1	259	4170	11.5	132	1520	9.0	81	729	7.6	58	439	6.7	45	301
	9	6.3	40	250	6.7	45	301	7.3	53	389	8.2	67	551	10.1	102	1030	11.5	132	1520	10.3	106	1090
	Σ_1	137.9	2259	38295	142.8	2388	40961	111.4	1443	19389	82.5	780	7573	68.7	544	4472	60.6	443	3554	54.0	351	2514
EMERGING SIDE OF HULL	NO. SEC.				y_2	y_2^2	y_2^3	y_2	y_2^2	y_2^3	y_2	y_2^2	y_2^3	y_2	y_2^2	y_2^3	y_2	y_2^2	y_2^3	y_2	y_2^2	y_2^3
	1				8.1	66	531	7.2	52	373	6.7	45	301	6.5	42	275	6.6	44	287	7.1	50	358
	2				17.2	296	5090	17.4	303	5270	17.7	313	5550	18.2	331	6030	18.4	339	6230	18.4	339	6230
	3				17.8	317	5640	18.2	331	6030	18.9	357	6750	19.7	388	7650	19.8	392	7760	19.6	384	7530
	4		AS ABOVE		18.3	335	6130	19.2	369	7080	20.8	433	9000	22.7	515	11,700	22.6	511	11540	21.0	441	9260
	5				18.3	335	6130	19.2	369	7080	20.8	433	9000	22.8	520	11,850	22.7	515	11700	21.0	441	9260
	6				18.3	335	6130	19.2	369	7080	20.8	433	9000	22.7	515	11,700	22.6	511	11540	21.0	441	9260
	7				17.3	299	5181	18.0	324	5830	19.1	365	6970	20.2	408	8240	20.5	420	8620	20.1	404	8120
	8				16.6	276	4570	17.2	296	5090	18.1	328	5930	19.0	361	6860	19.6	384	7530	19.5	380	7410
	9				6.2	38	238	6.3	40	250	6.5	42	275	7.1	50	358	8.0	64	512	9.4	88	831
	Σ_2				138.1	2297	39669	141.9	2453	44083	149.4	2749	52776	158.9	3130	64663	160.8	3180	65719	157.1	2968	58259

DISPLACEMENT P_0 = 3323 TONS; CORRESP. DRAFT = H_0 = 18'-6"; CR. OF BUOYANCY ABOVE KEEL = C_0 = 10'.03;

G. ABOVE KEEL = g_0 = 13'.5; LENGTH OF SHIP = L_0 = 240'-0"; $\lambda = \frac{L_0}{9}$ = 26'.67; $\frac{1}{2}\lambda$ = 13.33. $\frac{1}{3}\lambda$ = 8.89;

$\varphi = \frac{\pi}{18} = 0.1745$; $\frac{1}{2}\varphi = 0.0873$

center plane. The figures are obtained by multiplying the values given in column III by $\frac{1}{2}\lambda = L_0/18$.

By dividing the values of column VI by the corresponding values in column V, we obtain the distance η of the center of gravity of the water plane from the above axis, the quotients being given in column VII. Column VIII contains the values of $\frac{1}{2}\lambda\ \frac{1}{2}\varphi\ (\Sigma y_1^2 - \Sigma y_2^2)$, which gives one-half of the volumes of the emerging wedges for the various angles of inclination. The moments of inertia of the water planes of inclination, $I = 1/3\lambda\ (\Sigma y_1^2 + \Sigma y_2^3)$ are given in column IX, and the moments of the angles of inclination, or the products $I\varphi$, are given in column X.

The principal moment M is found as shown in Table IV. The second column is taken from column X, Table III, the values are multiplied by the cosines of the angles of inclination (given in the third line from the bottom), and the products are entered as indicated. When all the triangles have been filled, the products are added diagonally. These calculations may be indicated thus:

In the third column, $\frac{1}{2}m_{60\ deg.}$, $\frac{1}{2}m_{50\ deg.}$, $\frac{1}{2}m_{40\ deg.}$ ..... $\frac{1}{2}m_{0\ deg.}$ In the second column, $.985m_{50\ deg.}$, $.985m_{40\ deg.}$ .....$.985m_{0\ deg.}$, etc. And the summation, $M_{60\ deg.} = \frac{1}{2}m_{60\ deg.} + .985_{50\ deg.} \ldots + .500m_{0\ deg.}$, etc., which sums are entered in the last line of the table. These sums are the resulting righting moments at the various degrees of inclination.

Table V is used for finding the correction moment n due to the difference in the volumes of the emerged and immersed wedges. In line III are entered the figures from column VIII, Table III, and in line II the same figures are entered but here they are transposed so that the value given for any stated angle of inclination is entered under the next higher angle. Line IV, which gives the sums from the previous lines, thus indicates the increases in displacement for the various angles of inclination. In line V are entered the values for η from column VII, Table III, which are multiplied into the figures of the previous line, giving the desired correction n.

Table VI is used for assembly purposes. In the upper line are entered the values for P_0, G_0 and for $a_0 = g_0 - c_0$ (i. e., the distance between the center of gravity and the center of buoyancy). The total righting moment is $M - n - P_0a_0\sin\varphi$, the value of which may be found for every tenth degree by means of this table.

It seems sufficient to add that in column I are entered the differences between the values for M and n for corresponding angles of inclination. In column II the same differences are given expressed in foot-tons, which values are obtained by dividing the figures in column I by 35. Column III gives the correction for the location of the center of gravity of the ship, which is expressed by $P_0a_0\sin\varphi$. Column IV contains the differences between columns II and III, so that the figures in this column are the total righting moments. By dividing these moments by P_0 we obtain the corresponding lever arms, which are entered in column V, Table VI.

In order to obtain the corrections for loadings other than normal, Tables VII and VIII are made out. The total righting moment effective when the ship is loaded more deeply than to the normal load waterline is given by $M - n - P_0a\sin\varphi + p(\eta - h\sin\varphi)$, in which the last member is the correction for the excess load. In the formula p is the excess load in tons, η the figures from Column VII, Table III, h the distance of the center of gravity of the overloaded ship from the normal load waterline. The expression M-n is constant and may be figured once and for all, while the other members of the formula vary with the different locations of the

Generated on 2024-09-12 11:24 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

TABLE VI

$P_o = 3323$; $g_o = 13.5$; $a_o = 3.47$

$\varphi°$	I $M-n$	II $M-n$ IN TONS	III $P_o a_o \sin\varphi$	IV II−III	V IV÷P_o ARM IN FT.
10	120880	3455	2000	1455	0.44
20	226180	6465	3945	2520	0.76
30	293770	8390	5760	2630	0.79
40	336500	9615	7415	2200	0.66
50	367700	10510	8830	1680	0.51
60	382600	10930	9990	940	0.28

TABLE III

I $\varphi°$	II $\Sigma y_1 + \Sigma y_2$	III $\Sigma y_1^2 - \Sigma y_2^2$	IV $\Sigma y_1^3 + \Sigma y_2^3$	V AREA OF W.L. $= II \lambda$	VI STATIC MOMENTS OF W.L. $= III \times \frac{1}{2}\lambda$	VII C.G. OF W.L. FROM INTERSECTION OF LWL AND C.L. $n = VI \div V$	VIII $\frac{1}{2}$ VOLUME OF EMERGED WEDGE $= V \times \frac{1}{2} g$	IX MOM. OF INERTIA OF W.L. $= I - IV \times \frac{1}{3}\lambda = m$	X $m = IX \times g$
0	275.8	00	76590	7355	00	00	00	680600	118700
10	280.9	+ 91	80630	7495	+ 1210	+ 0.16	+ 106	716500	125000
20	253.3	− 1010	63472	6760	− 13480	− 1.99	− 1177	564000	98400
30	231.9	− 1969	60349	6180	− 26270	− 4.25	− 2292	536400	93600
40	227.6	− 2586	69135	6070	− 34500	− 5.69	− 3012	614000	107200
50	221.4	− 2737	69273	5905	− 36500	− 6.18	− 3188	615700	107400
60	211.1	− 2617	60773	5630	− 34900	− 6.20	− 3045	540000	94200

TABLE IV

MULTIPLY CROSSWISE
ADD DIAGONALLY
MOMENT M

m_{60} 94200	47100						
m_{50} 107400	53700	105800					
m_{40} 107200	53600	105500	100700				
m_{30} 93600	46800	92200	87900	81000			
m_{20} 98400	49200	96900	92400	85200	75400		
m_{10} 125000	62500	123100	117500	108200	95700	80300	
$\frac{1}{2}m_0$ 59350		58400	55800	51400	45500	38200	29700
cos φ	$\frac{1}{2}$	.985	.940	.866	.766	.643	.500
$\varphi°$	0	10	20	30	40	50	60
M	0	120900	228100	312600	391900	466200	520000

TABLE V − MOMENT n

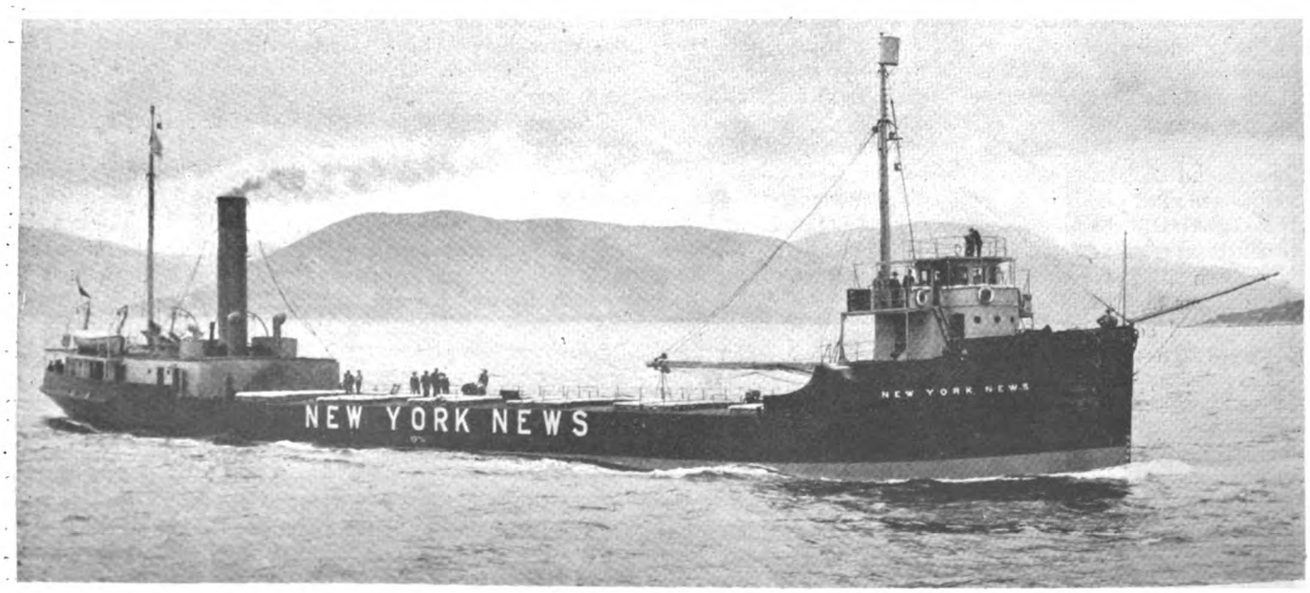
	10°	20°	30°	40°	50°	60°
I VOL. FOR PRECEDING ANGLE OF INCLINATION	0	+ 106	− 965	− 4434	− 9738	− 15938
II TAB. III, COL. VIII, TRANSP.	0	+ 106	− 1177	− 2292	− 3012	− 3188
III " " " "	+ 106	− 1177	− 2292	− 3012	− 3188	− 3045
IV SUM OF LINES I, II and III	+ 106	− 965	− 4434	− 9738	− 15938	− 22171
V n	+ 0.16	− 1.99	4.25	− 5.69	− 6.18	− 6.20
VI $n = IV \times V$	20.	1920.	18830	55400	98500	137400

$P_o = 3323$ tons
$C_o = 10.03$
$H_o = 18.5$
$p = P - P_o$
$a_o = g - C_o = 13.5 - 10.03 = 3.47$
$h = g - H_o$

center of gravity and with the different overloads, so that these members must be computed for the various conditions.

The quantities given in the first line in Tables VII and VIII are P_1, P_2=displacement for the overloaded ship, in tons; C_1, C_2=distance of center of buoyancy from keel, in feet; g_1, g_2=distance of center of gravity of ship from keel, in feet; p_1, p_2=the excess load, in tons; a_1, a_2=$(g_1 - c_1)$, $(g_2 - c_2)$; h_1, h_2=$(g_1 - H_0)$, $(g_2 - H_0)$.

The quantity n is positive when the center of gravity lies above the load waterline, i. e., when the ship is light; and negative when the center of gravity lies below the load waterline, i. e., when the ship is loaded.



S. S. New York News, Built by the North of Ireland Shipbuilding Company for the Ontario Paper Company, Is the Pioneer Ship of a Fleet of Special Steamers to Run on the Great Lakes. The Vessel Is 250 Feet Long Between Perpendiculars, 43 Feet Beam and 19 Feet 4 Inches Molded Depth, with a Speed of 10 Knots

Generated on 2024-09-12 11:34 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

ER. 1922

Twin Vane-Wheel Propulsion of Ships

Model Experiments and Full-Size Ship Trials Show High Propulsive Efficiency Possible with Vane-Wheel Drive

PROPULSION by means of a screw, or screws, partially immersed has been experimented with at various times with small success, but recent experimental investigations with models by William Denny and Brothers, Ltd., Dumbarton, Scotland, have revealed the conditions that must be fulfilled in order to secure the advantages of this form of propulsion, and the model results have been confirmed by actual tests on a full-sized ship.

Vane-wheels, as manufactured by Messrs. Denny and Brothers, are partly immersed wheels having their axes above water and substantially in the line of advance. They are fitted with propelling vanes over the immersible circumferential portion, the vanes having a pitch so that when the wheels are rotated they exert a forward thrust on the vessel.

In order to avoid any undesired steering effect, it is necessary to have two vane-wheels of identical dimensions, and symmetrically placed in relation to the hull of the ship. The pitch of the vanes of one wheel is right-handed and of the other left-handed. They are rotated in opposite directions—preferably outward on top—so that the transverse thrust of each vane is balanced by that of the other when they are driven at the same revolutions per minute; also the steering effect of each forward thrust moment is equal and opposite.

Partly immersed propelling wheels, such as side or stern paddles, are usually associated with vessels of such limited draft, in relation to speed and power, as to prohibit the application of screw propellers except at a great sacrifice of propulsive efficiency. It appears from the recent Denny experimental investigations with models, confirmed by a trial of a full-sized ship, that vane-wheels can not only advantageously replace other means of propulsion in such vessels, but may also be profitably applied to numerous cases where the draft is not so restricted, the limiting considerations being apparently, relative staunchness, or freedom from possible damage, if the vessel is to ply in rough seas. The suitability, or otherwise, of vane-wheels for rough seas has, however, yet to be proved and determined.

The dimensions, pitch and area of the vanes must be designed to suit the speed, revolutions per minute and power. The vane-wheels may be placed side by side abaft the stern of the ship, or they may be placed one on each side of the ship at any point forward of the stern.

The advantages of the twin vane-wheel method of propulsion are as follows:

A. High propulsive efficiency in relation to all other known methods of propulsion.

B. Great maneuvering powers.

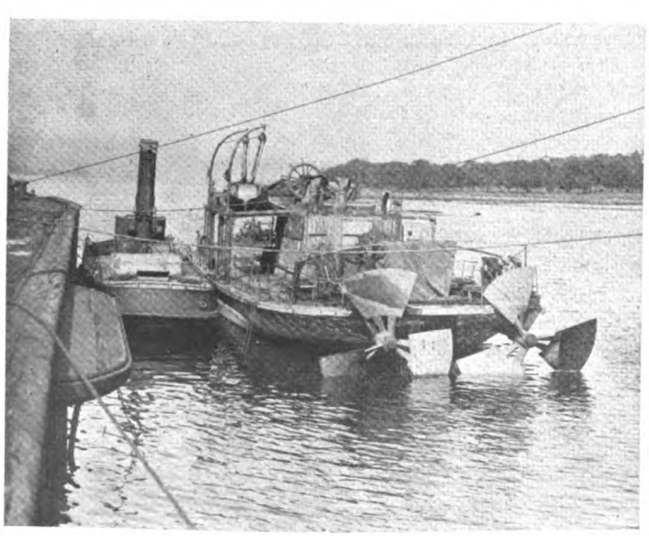
C. Effective variation of water acted upon with variation of draft, and therefore of variation of the thrust required.

D. Higher revolutions per minute than either side paddle wheels or stern paddle wheels, and therefore less weight of machinery.

E. With vane-wheels abaft the stern of the ship the overall width is less than that with side paddle wheel method; there is also less overall length of ship and wheels than in the stern paddle wheel method.

F. The wheels are stronger and lighter than either side paddle wheels or stern paddle wheels.

With regard to the advantage *A* it appears that vane-wheels are so very efficient as to warrant their adoption in many cases of vessels of deep draft. Without referring to the results of numerous experiments with models of vane-wheels applied to models of ships, it will be sufficient for present purposes to give the actual results obtained from measured mile trials of a twin-screw ship, which was first tried with her twin screws, and afterwards with vane-wheels



Denny Brothers' Experimental Vessel Fitted With Vane-Wheels for Its Propulsion

Stern View of Vane-Wheel Propelled Vessel Under Way, Showing Wake

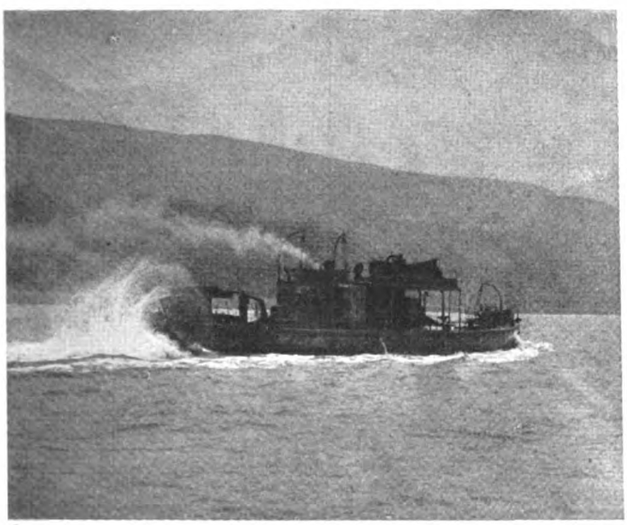
Generated on 2024-09-12 11:26 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

driven by leather belting from the main engines (a temporary arrangement). The particulars of the vessel, and results obtained, are as follows:

Length	100 feet
Breadth	23.5 feet
Draft, forward	4 feet 5½ inches
Draft, aft	4 feet 8 inches
Draft, mean	4 feet 6¾ inches
Displacement	186 tons
Speed	9 knots

	Screw Propellers	Vane Wheels
Diameter	4 feet	11 feet
Pitch	5 feet 8 inches	16 feet
Number of blades	3	3
Total disk area	25.14 square feet	.....
Total projected area	10.2 square feet	.....
Immersion of tips in still water	3 7/16 inches	.....
Revolutions per minute	226	66
Total sectional area of water acted upon when at full speed	.....	59.26 square feet
Effective horsepower of naked hull	77.5	77.5
Shaft horsepower	197	116

It will be seen that the vane-wheels gave the same speed as the twin screws with 41 percent less shaft horsepower.



Experimental Vessel Driven by Twin Vane-Wheels at Nine Knots

This was confirmed by the measured difference in oil consumption allowing for the loss due to the belt drive.

It will also be seen that the propulsive efficiency of the twin screws was rather low, though the resistance of the shaft brackets and projections (in this case amounting to 12 percent of the effective horsepower of the naked hull), together with the effect of the small immersion of the tips of the propellers, would probably not permit of a much higher efficiency being obtained.

In evolving a new design for a vane-wheel vessel several alternatives are available. If the speed is fixed, then the vane-wheels will require considerably less power than twin screws for the same dimensions and form of ship and this will permit of either increased deadweight, or, by the adoption of finer lines for the vessel, a still further reduction of power for the same speed. If it be preferred to obtain a higher speed than twin screws will give for the same dimensions and form, then the increase of speed depends on the relation of increase of power to increase of speed, but it will, in any case, be a considerable amount.

Advantage *B* must be seen to be fully appreciated, but a vane-wheel vessel can be made to turn very rapidly about its own axis without advancing.

Advantage *C* is somewhat unique, for, although side paddle wheels and stern paddle wheels seem to possess the same advantage, yet for understandable reasons it is well known that their propulsive efficiencies become considerably reduced with both over immersion and under immersion, i.e., the design does not permit of much variation of draft of ship. In the case of vane-wheels every portion of the immersed vanes is applied effectively at all drafts. The vane-wheels permit of considerable variation of immersion, so that at the deeper drafts they have the advantage of acting efficiently on a greater sectional area of water, and thus the revolutions per minute and slip, for the same speed, are not so variable in terms of draft variation as is the case with the other available methods of propulsion.

At the lighter drafts of a vessel which is run at considerable variations of draft the percentage reduction in the sectional area of the water acted upon is greater than the percentage reduction of thrust, so that, if the pitch of the vane-wheels be uniform, the revolutions per minute and slip will be greater than for the deeper drafts.

It is proposed to make experimental investigation to ascertain if further advantage can be secured by gradually increasing the pitch of the vanes towards the extreme diameter, with a view to securing even less variation of revolutions per minute with varying draft and the same speed.

An explanation of the causes of the high propulsive efficiency of the vane-wheels may be found in the following facts:

The hubs of the vane-wheels are out of the water and therefore involve no extra resistance as in the case of ordinary screw propellers. Vane-wheels do not require any immersed supports as in the case of twin screws, e.g., bosses or brackets. Every portion of the immersed vane is acting efficiently during its passage through the water, being superior to paddle floats in that respect. Vane-wheels can be, and are, more favorably placed in relation to the flow of water around the hull than is the case with ordinary screw propellers or with stern paddle wheels.

Pneumatic Tools

TWO new developments in pneumatic tools made by the King Pneumatic Tool Company, Chicago, are a sleeve-type valve for riveting hammers and a "Progressive" lock for both chipping and riveting hammers which prevents the handles from coming loose on the cylinders.

The King sleeve valve for riveting hammers is designed to eliminate valve breakage and reduce the necessity of oversizing valves to a minimum. In the King riveting hammer valve the hard and fast hitting qualities of the hollow-valve type riveting hammer are maintained and the question of valve breakage is claimed to be solved. Formerly a riveting hammer piston in hollow-valve type hammers came in direct contact with the valve; the piston and the valve moved in opposite directions and the piston came in direct contact with the valve 1,050 to 1,720 times per minute, according to the length of stroke of the hammer. This constant contact between piston and valve resulted in fatigue of the metal in the valve itself, with resulting valve breakage.

In the King sleeve-type valve the sleeve is interposed between the valve and the piston, making any contract between the two impossible. At the same time the sleeve provides a continuous bearing surface for the piston. An added advantage of the sleeve-type valve is that the sleeve serves as a guide to the valve in its travel, thus reducing the lateral wear to a minimum. This new device has been so successful in eliminating valve breakage that last year, out of 5,000 King sleeve valves placed in service, only 15 cases of breakage were reported.

King pneumatic tools are now made entirely of molybdenum steel, which has added to their strength and durability.

Generated on 2024-09-12 11:26 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

A Double Acting Marine Diesel Engine

Satisfactory Tests on 240 Horsepower Unit Causes Rapid Construction of Three-Cylinder, Two-Cycle 2,000 Brake Horsepower Engine

THE North British Diesel Engine Works has evolved a double acting Diesel engine having three cylinders of small dimensions and working on the two-cycle principle. Thus another type of marine engine is added to the long list. The job of the marine engineer of thirty years ago, with his reciprocating steam engine, looks like a sinecure today in comparison with the study and work that must now be put in just to keep up to date with the various developments.

A long struggle for supremacy is bound to occur between the turbine with its mechanical reduction gears, the turbine with the electric drive, the Diesel engine with the direct drive, reduction gears both mechanical and electrical, single, compound, two-cycle, four-cycle and double acting, to say nothing of such variations as opposed pistons and combinations of steam and oil fuel.

Competition will be keen and for this reason the double acting oil engine offers theoretical possibilities in the reduction of weight and space and in simplicity that the development of this type of engine is bound to be watched with interest. The shipowner of course wants the type of engine that will reduce his operating costs to a minimum but above all he demands regularity and reliability of performance.

The engine illustrated by Figs. 1 and 4 was built and thoroughly tested by the North British Diesel Engine Works. It has two working cylinders of 11½ inches bore and 14½ inches stroke. At 250 revolutions per minute it develops 240 brake horsepower. This engine is said to be very carefully balanced and it is claimed that with a combination of anywhere from 3 to 8 cylinders a balance can be obtained that will compare with that of a four-cylinder triple or quadruple expansion steam engine.

Principle of Operation

The diagram shown in Fig. 4 illustrates the principle upon which the engine operates, although some changes and improvements have been embodied in the 2,000 brake horsepower engine that is now under construction.

The engine consists of an open ended cylinder *A*, made in two parts and flanged for bolt connections in the middle. The water jacket *B*, together with the scavenge and exhaust pipes *C*, *C1*, *D*, *D1*, are free to reciprocate using the top and bottom cylinder covers *E*, *E1* as guides. The cylinder covers are stationary being fitted with gas tight rings of the piston type. Each cover is fitted with a fuel and starting air valves.

Piston and Connecting Rods

The trunk type piston *F* is fitted with a gudgeon pin *G*, which projects through the axial slots *V* in the cylinder *A*. The crosshead slippers *K*, *K1* are fastened, one at each end of the gudgeon pin. Bearings *H*, *H1* are provided on the parts of the crosshead slippers which are attached to the ends of the gudgeon pin *G* to take the connecting rod top end bushes *J*, *J1*. The connecting rods *L*, *L1* run between the cross-

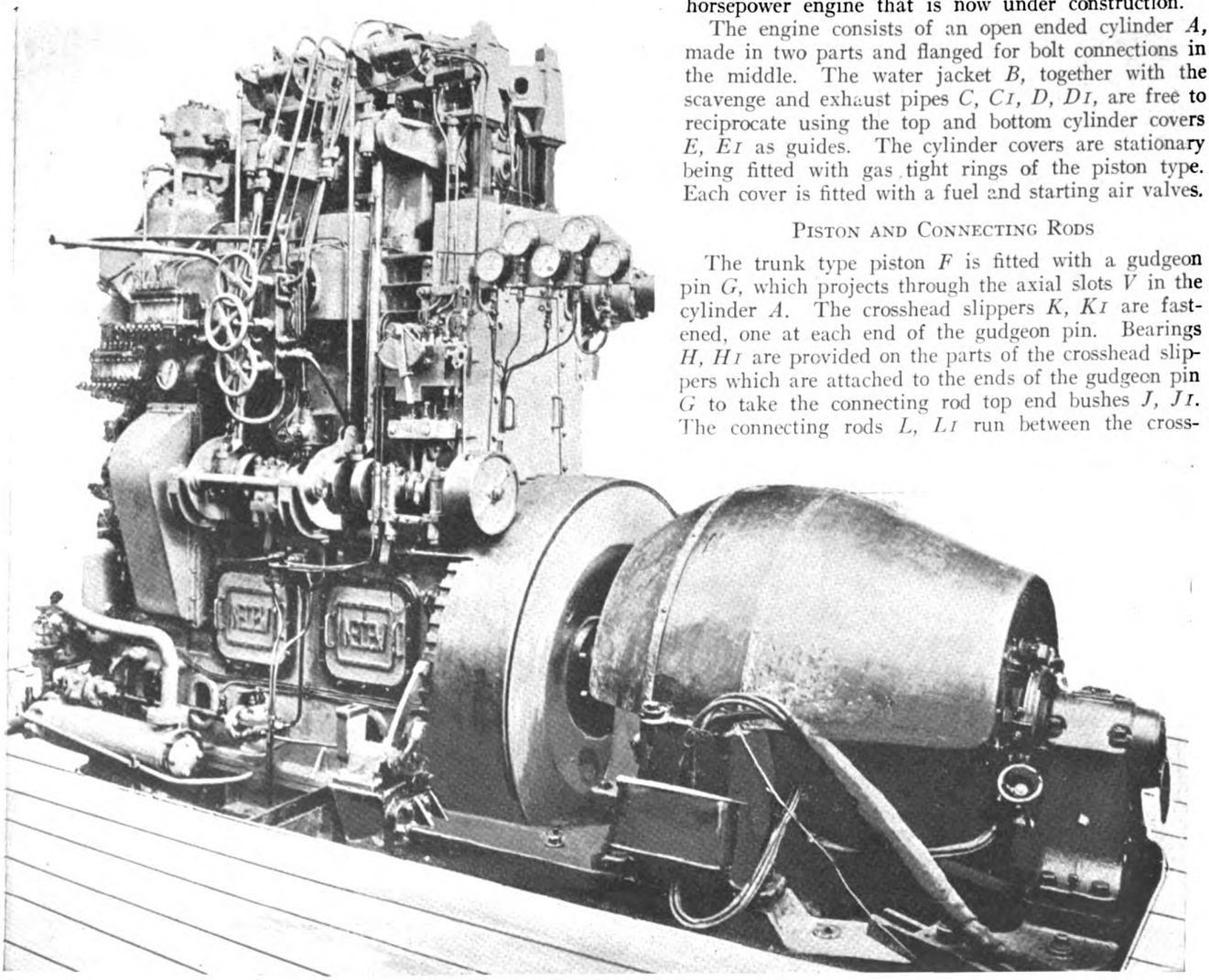


Fig. 1.—The New North British Double Acting Two Cycle Marine Diesel Engine

Generated on 2024-09-12 11:22 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

head bearings and the forked end M. The lower end of the forked end M is connected to the crank pin by the bearing N. The crank is designated by the letter P and the shaft bearings by Q, $Q1$.

Cylinder Operation

The special feature of this engine is the moving cylinder which reciprocates synchronously with the piston but through a much smaller distance. The cylinder A, the water jacket B, scavenge pipes C, C_1 and exhaust pipes D, $D1$ are made to reciprocate through the action of a cam shaft driving the cranks and connecting rods S, T, U, Z. The crank Z on the cam shaft drives the rod S, which is connected at the top to the beam levers T, which are pivoted at W. U and $U1$ are links which are attached at their top ends to trunnions fitted to the cylinder and at their lower ends to the levers T, $T1$.

It is to be noted that the cylinder A and its water jacket B travel in the same direction as the piston but at a lower speed. Scavenging ports C_2, C_3, which are supplied by the scavenge air pipes C, C_1, are uncovered by the relative movement of the cylinder A to the cylinder covers E, $E1$.

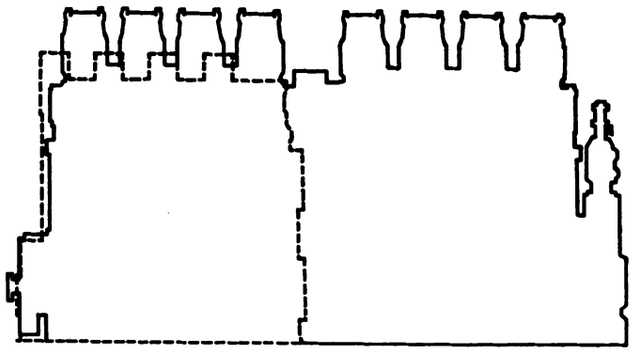


Fig. 3.—Comparison Between Double Acting Diesel Engine (dotted lines) and Four Cycle Diesel (solid lines) of 2,000 Indicated Horsepower

In like manner the relative movements of the piston and cylinder uncover the exhaust ports $D2$, $D3$, through which the exhaust gases pass to pipes D, $D1$. A supercharge of scavenging air is obtained by opening and closing the exhaust ports before the scavenging ports but this has not been found to be essential and will not be embodied in the new engine.

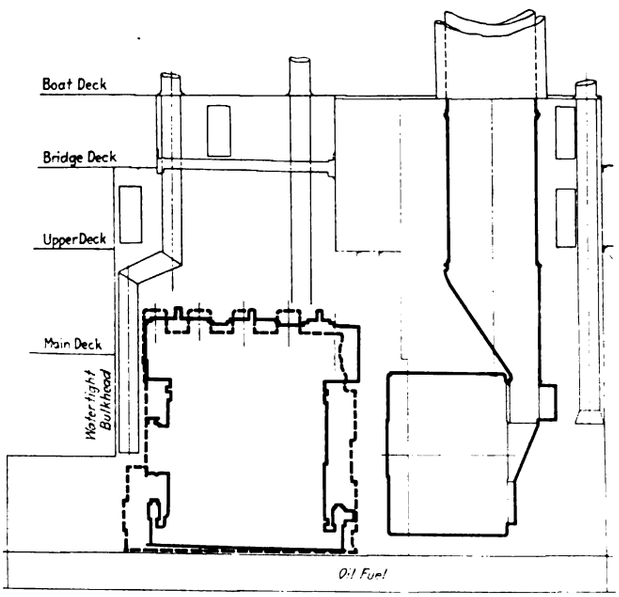
Stuffing boxes are provided in the fixed scavenge supply pipe X for each of the reciprocating scavenge branches and also in the fixed exhaust manifold Y for the moving exhaust branches. In this engine the branches are uncooled but water-cooling is contemplated for the larger engines.

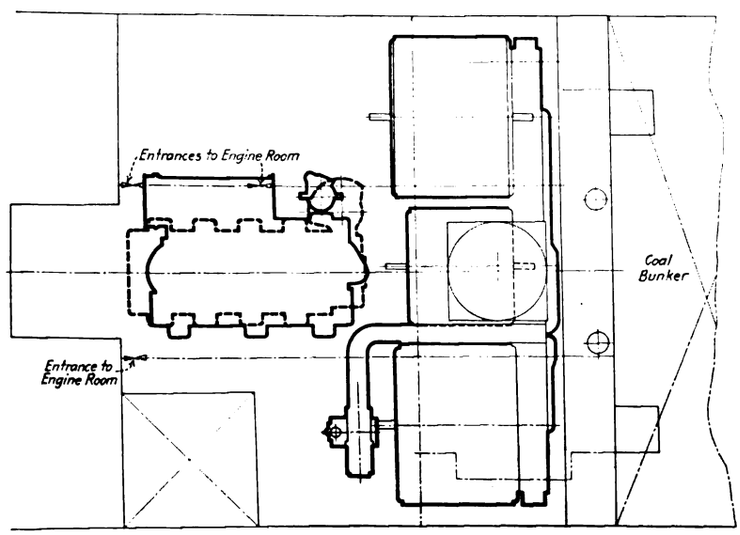
Cylinder Covers

The cylinder covers E, $E1$ are fixed to the main structure. Fuel valves in both top and bottom covers are operated by cams. Both fuel pumps and air starting distributing valves are also driven from the cam shaft. A horizontal lubricating oil pump and a circulating water pump are driven at the end of the crank shaft remote from the fly wheel. The scavenging air pump and a three-stage air compressor are driven from a common crank with forked links.

Advantages Claimed

As is well known, cylinder expansion is one of the hardest things to take care of in big engines. In this engine the cylinder is free to expand longitudinally and radially and in





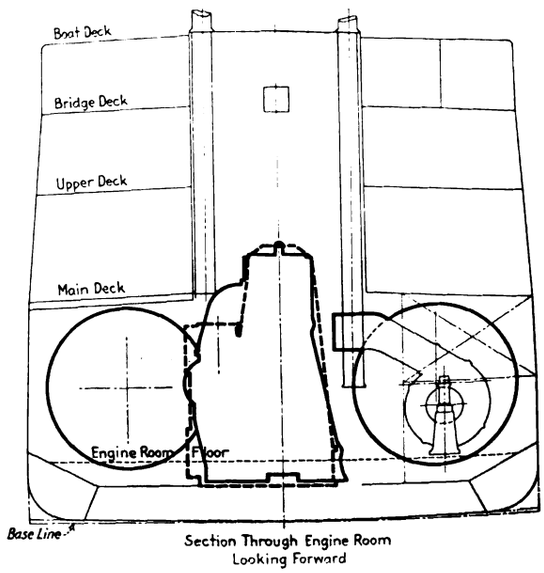


Fig. 2.—Comparison Between Double Acting Diesel Installation (heavy dotted lines) and Corresponding Steam Reciprocating Installation (heavy solid black lines) of 2,000 Indicated Horsepower

Generated on 2024-09-12 11:26 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

the way of combustion space it takes the form of a plain cylinder entirely surrounded by water. It is also to be noted that, due to the motion of the cylinder itself, the rubbing speed of the piston is reduced about 30 percent. The arrangement of scavenging and exhaust ports being at opposite ends of the working cylinder is exceptionally good as through scavenge is obtained and it also does away with certain heat stresses. Another point is that the cylinder covers may be removed without breaking any high pressure cylinder joints.

3-Cylinder, 2,000-B.H.P. Engine

The trials of the engine just described were so satisfactory that the North British Diesel Engine Works has proceeded to construct a 2,000 brake horsepower engine on the two-cycle principle. The engine will have three cylinders with a 24½-inch bore and a stroke of 44 inches. It will run at 100 revolutions per minute. Many improvements in mechanical detail are included in the new design and it is claimed that a remarkable simplicity of construction is obtained in spite of the necessity for providing mechanism for reciprocating the cylinders.

Space Comparisons

The saving in space, which is accomplished by an engine of 2,000 horsepower of this type, as compared with a corresponding steam engine and also with a four cycle single acting Diesel is illustrated in Figs 2 and 3. The four cycle engine, shown in Fig. 3, was installed in the motor passenger liner *Domala* and was also manufactured by the North British Diesel Engine Works. The steam installation shown in Fig. 2 is a single screw steam reciprocating engine of 2,000 indicated horsepower.

The double acting Diesel engine is shown in both cases as a four-cylinder engine having a cylinder bore of 22 inches as compared with 26½ inches in the eight-cylinder four-cycle single acting engine and it is claimed that it weighs just one-half as much. Only half of the main bearings, crosshead bearings and guide shoes are required and only 8 cylinder valves are required as compared with 24 in the four-cycle engine. They both have the same number of revolutions per minute but the four-cycle engine has a piston speed 88 percent greater than that of the sliding cylinder double acting engine.

As compared with the steam engine, it is seen that the double acting engine only takes up the space of the reciprocating steam engine leaving the boiler and bunker space available for extra cargo. With such possible advantages, there is no doubt that the developments in this type of engine will be watched with extreme interest.

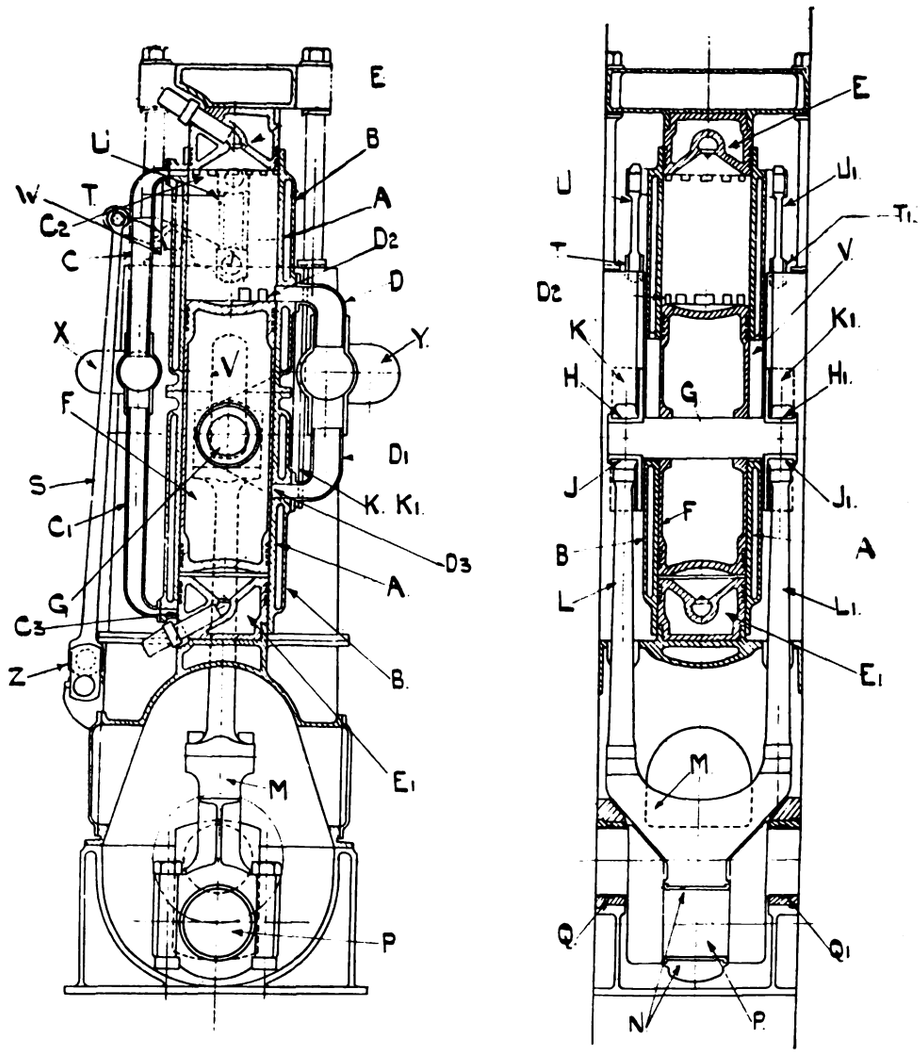


Fig. 4—Diagrammatic Sketch Showing Construction and Operation of New North British Double Acting Diesel Engine

---

Electrically Propelled Battleships Win Honors. —Chief honor for excellence in engineering for the year 1921-22 has been awarded the U. S. S. *California*, third of Uncle Sam's electric ships, by Acting Secretary of the Navy Roosevelt. Second honors were awarded the U. S. S. *New Mexico*, the first electrically propelled battleship to float on the seas. The equipment of this vessel is several years old.

Eighteen battleships were considered in making the awards. So that all ships might start the year on as near an equal standing as possible, handicaps were allowed the vessels of older type and with other kinds of propelling apparatus.

In recognition of these high honors, the *California* will have a white "E" painted on her smokepipe, and the *New Mexico* will have a red "E" on her after smokepipe. The *New Mexico* has carried the white "E" for the past year, having won the highest honors in engineering for the year 1920-21. She now passes this honor to the *California*, which was commissioned and entered in the competition about one year ago. Both ships were electrically equipped by the General Electric Company.

The enlisted men of the engineering force on the *California* will each be awarded a prize of $10 by the government, and a letter of commendation, signed by the Secretary of the Navy, will be sent Rear Admiral Henry J. Zeigemeier, commander of the ship. Admiral E. W. Eberle, commander-in-chief of the Pacific fleet, warmly congratulated the officers and men of the *California* on these well earned honors.

Generated on 2024-09-12 11:28 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

A Method of Determining the Natural Periods of Vibration of Ships*

By T. C. Tobin, M. A.

So far as the writer is aware no direct method of attacking this problem has been put forward which is at once adequate and of comparatively easy application along the lines of ordinary drawing office procedure.

The usual method of estimating the fundamental periodicities of a ship's vibration by means of a formula of the character

$$P = A\sqrt{\frac{I}{\Delta L^3}}$$

in which A is an empirical coefficient, leaves much to be desired; for the burden of accuracy in the estimate is borne entirely by coefficient A, which as a rule receives the treatment accorded to so many other empirical constants in naval architecture.

The method of direct attack suggested in what follows is based on the theory of vibrating bars made familiar by the work of the late Lord Rayleigh. For this purpose a ship is conceived as corresponding to a bar in lateral vibration, and it is evident of course that the variation in the distribution of the weight throughout the length of the vessel, as well as the variation of the ship's structure, prevent it from being considered as a uniform bar.

In the usual formula just quoted these variations meet in the one constant A; and the success of the ordinary procedure depends on a knowledge of the fundamental periods of some ship which is sufficiently similar to the one under consideration to ensure that the errors due to differences of weight and strength distribution are negligible. The necessary condition holds in very few cases, and the formula affords no means of estimating the periods for any novel distribution. In the procedure to be outlined the variations are dealt with on their own merits.

Were the ship a uniform bar the frequency of its periods would be given by:

$$P = \frac{n^2}{2\pi}\sqrt{\frac{EIg}{\Delta L^3}}$$

where E is Young's modulus for the material of the structure; I the moment of inertia of the cross section of the bar; Δ the weight in tons; L the length in feet; g the gravitational constant; and n a numerical magnitude depending on the mode of vibration.

When the mass and rigidity vary along the length of the bar, the frequency is modified to p where

$$p = P\sqrt{\frac{1+\delta c/c}{1+\delta a/a}} \quad \text{.....(See Appendix I)}$$

This may be taken to be true to a close approximation, so long as the type of vibration remains approximately normal.

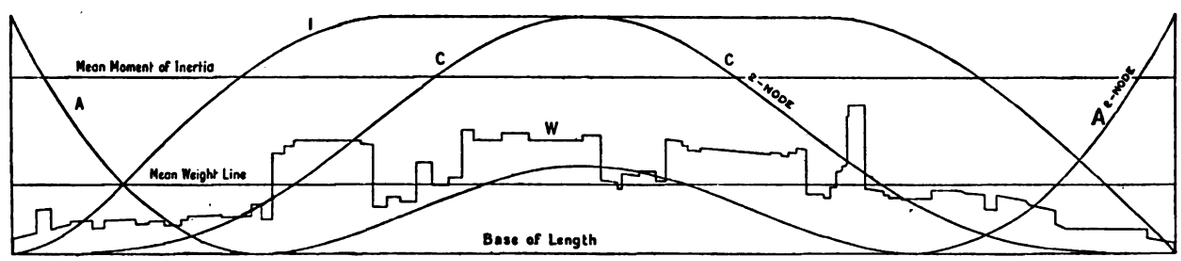


Fig. 1

This modification was originally devised to meet the case of small variations of mass and flexural rigidity, and it does not necessarily follow that the method would give close results, when the variations are somewhat large. It appeared, however, to the writer that for a large body, such as a ship, there was a possibility of the vibrations not departing from the normal to any great extent, and that the application of this formula would give a determination of the periods which would be useful for estimating purposes.

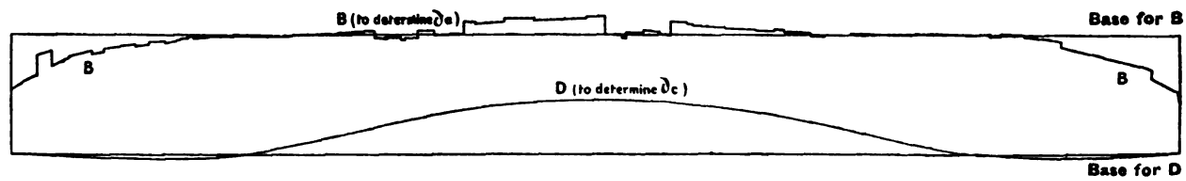


Fig. 2

The quantities a, δa, c, δc, are determined as follows: The weight distribution curve W, Fig. 1, is plotted for the vessel, and the mean weight line drawn; the auxiliary curve A is also drawn covering the same range as the weight curve;

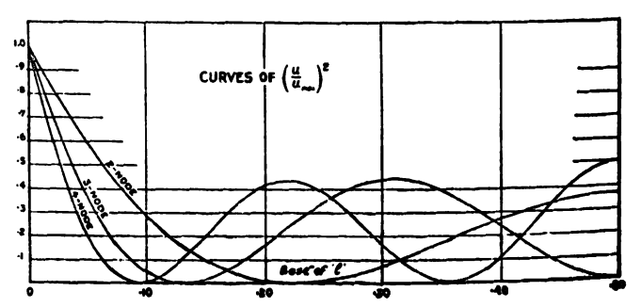


Fig. 3

*Paper read at the sixty-third session of the Institution of Naval Architects, London, April, 1922.

Generated on 2024-09-12 11:25 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

the difference of the ordinates of the weight curve and the mean weight line at any given point in the length is multiplied by the ordinate of the auxiliary curve A at that point and the series of products thus obtained plotted as a curve over the whole range, as B, Fig. 2. The area of the B curve is integrated by any convenient method, mechanical or otherwise, and this integral is the quantity δa; the integral of the auxiliary curve A multiplied by the integral of the weight curve, both taken over the range of length, gives the quantity a; hence dividing one by the other we obtain $\frac{\delta a}{a}$.

In a similar manner $\frac{\delta c}{c}$ is obtained, by using, instead of the weight curve, a curve giving the distribution of the moment of inertia (I) throughout the length, and another appropriate auxiliary curve C, to obtain the curve D in Fig. 2.

The ship may be compared to a bar which has both ends unconstrained, or in the Rayleigh nomenclature a "free-free" bar. Such a bar may of course vibrate in a two-node, three-node, four-node, . . . r-node manner.

For each mode of vibration a particular auxiliary curve for each of the δa and δc determinations is required; those associated with the δa for the two-, three- and four-node vibrations are shown in Fig. 3, and those associated with δc in Fig. 4.

As a test of the utility of the methods it was applied to two ships of widely differing types.

The first case was that of an oil tanker, particulars of which were published in the *Transactions of the Society of Naval Architects and Marine Engineers* in 1915.* Investigations carried out on this vessel showed that the fundamental period had a frequency of 76 vibrations per minute; while calculations carried out on the lines which have been indicated gave the frequency of the two-node vibrations as 75.4 per minute, on the assumption that Young's modulus had the value 12,500 inch-ton units.

The second case was that of a large passenger liner. An extensive series of records made with a Schlick pallograph showed that under certain observed conditions of loading two clearly defined periods of vibration were observable which appeared to correspond to fundamental periods of the ship, and these had frequencies of 58.8 and 150 per minute.

The calculation for a two-node vibration carried out by the proposed method gave 59.4 as the corresponding number of vibrations per minute; the three-node calculation resulting in the figure 148.7; the value of Young's modulus E again being assumed to be 12,500.

In arriving at these figures a correction was made for the rotatory inertia effect in the manner suggested in Appendix II. For the two-node vibration it was of the order of 2½ percent, and for the three-node about 3¾ percent. The as indicated in Appendix III., and found to be quite negeffect of the varying local displacement was also estimated

*"The Period of Vibration of a Steamship," by W. Gatewood.

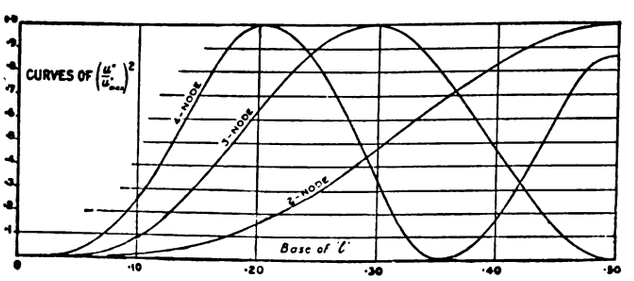


Fig. 4

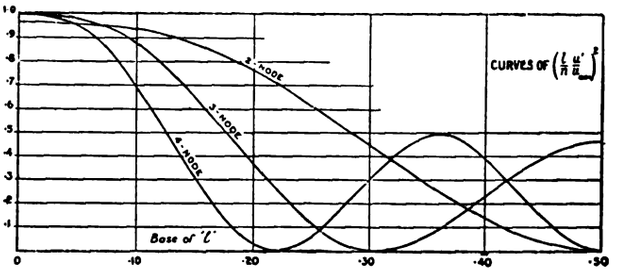


Fig. 5

ligible as might have been expected; the mean value of F in this case was about 2.6 tons.

Had second order terms expressing the interaction of modified two-node and three-node types of vibration been taken into account it would have resulted in a slight shortening of the three-node period and a slight lengthening of the two-node; this would have probably brought the ratio of the two periods more nearly into correspondence with the observed values. As it is, the correspondence is close enough to suggest that the method may prove a reliable one for investigating the values of the two gravest modes of vibration.

It is interesting to note that the same value of E fits the solution in both cases; and this is the only quantity whose value is directly assumed. From the opposite point of view it may be regarded as in some sense a corroboration that this value of E is an approximately correct one to use with ship structures of this type, when the values of I are estimated in the usual manner.

A calculation of the four-node vibration of the liner was also made, giving as a result a frequency of 269 per minute; the observed vibrations of the vessel gave, however, no decisive indications for this third fundamental mode of vibration. The value of the rotatory inertia correction in this case was of the order of 7½ percent.

It would be extremely interesting to have additional verification that the method gives results in harmony with observed vibrations of ships; unfortunately the time at the author's disposal did not permit him further to test its validity, but it is hoped that what has been said will be sufficient to indicate that the procedure merits the attention of those who may have to deal with concrete cases of vibration.

Appendix I

If the type of vibration of a "free-free" bar is considered as a deviation from the normal we may proceed as follows: The expressions for the kinetic energy, T, and the potential energy, V, for a uniform bar may be written in the general form:

$$2T = a\dot{\phi}^2$$
$$2V = c\phi^2$$

where ϕ is the normal coordinate corresponding to the type of vibration, and a and c are the mechanical functions.

If now the mass of the bar is altered in its longitudinal distribution, and the moment of inertia is also varied, these expressions become

$$2T' = (a + \delta a)\dot{\phi}^2$$
$$2V' = (c + \delta c)\phi^2$$

on the assumption that the type of vibration is not materially altered.

If P is the frequency for the uniform bar, and p that for the modified bar, we then have

$$P = \sqrt{\frac{c}{a}};\ p = \sqrt{\frac{c + \delta c}{a + \delta a}}$$

$$\text{i.e., } p = P\sqrt{\frac{1 + \delta c/c}{1 + \delta a/a}}$$

so long as the type remains approximately normal.

In the case of a doubly free bar we have the type:

$$y = A\,u\cos\left(\sqrt{\frac{EI}{m}}\cdot\frac{n^2}{l^2}\cdot t + \epsilon\right) = A\,u\,\phi$$

where u is the normal function satisfying the equation:

$$\frac{d^4u}{dx^4} = \frac{n^4}{l^4}u$$

A being an arbitrary constant; E, Young's modulus; m the mass per unit length; I the moment of inertia of the section, and l the length of the bar.

We have also:

$$a = m\int_0^l u^2\,dx \quad \text{and}$$

for the uniform bar

$$c = EI\int_0^l u''^2\,dx$$

Generated on 2024-09-12 11:46 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

and hence the variational values:

$$\left.\begin{aligned}\delta a &= \int_0^l \delta m \,.\, u^2\, dx \\ \delta c &= \mathrm{E}\int_0^l \delta \mathrm{I} \,.\, u''^2\, dx\end{aligned}\right\} \text{for the modified bar}$$

where $u' = \frac{du}{dx}$; and $u'' = \frac{d^2u}{dx^2}$

It would be possible, of course, to find

$$\int_0^l m\, u^2\, dx \text{ and } \mathrm{E}\int_0^l I\, u''^2\, dx$$

and the periodicity derived from this giving

$$p = \sqrt{\frac{\mathrm{E}\int_0^l \mathrm{I}\, u''^2\, dx}{\int_0^l m\, u^2 dx}}$$

but as u and u'' apply strictly speaking only to a uniform bar, and not to the bar with varying I and m, it is considered a sounder method of procedure to calculate as indicated above by δa and δc.

Auxiliary curves giving the variation of the values of u^2 and u''^2 over the range of length are required, and these were calculated from the differential equation given above together with the associated equation:

$$\cos n \cosh n = 1$$

The values expressed as ratios of the maximum value in each case are shown in Figs. 3 and 4 in the form of curves, and the numerical values are given in Appendix IV.

The values of n for the two-, three- and four-node vibration are, respectively, 4.7300, 7.8532, 10.9956.

Appendix II

To estimate the effect on the period due to the rotatory inertia we may use a modified expression for the kinetic energy, viz.:

$$2\,\mathrm{T} = \int_0^l m\, y^2\, dx + \int_0^l \mathrm{I}\left(\frac{d}{dt}\,.\,\frac{dy}{dx}\right)^2 dx$$

$$= p^2 \,.\, \sin^2 p\, t \left[\int_0^l m\, u^2\, dx + \frac{n^2}{l^2}\int_o^l \mathrm{I}\left(\frac{l\,u'}{n}\right)^2 .\, dx\right]$$

where $y = u \cos p\, t$,
$y = -u\, p \,.\, \sin p\, t$,
m = mass per unit length of curve of loads,
I = mass moment of inertia per unit length.

Curves of I, u^2 and u''^2 are wanted, the two latter in terms of the same units. I refers to the mass of material which has rotatory inertia, excluding the masses not rigidly attached to the ship; it will not therefore involve as a rule the total mass of the vessel.

For estimating purposes and to simplify the calculations it was assumed that the masses not rigidly attached to the structure were distributed uniformly over the depth of the section at each point; their moments of inertia then became equal to $\frac{m\, d^2}{12}$ where d is the depth of the section taken as uniform throughout the length and equal to the molded depth plus one-third of the mean sheer.

This assumption tends to increase the value of the correction, that is, to over-estimate it rather than under-estimate it. Curves of $\left(\frac{l\,u'}{n}\right)^2$ are given in Fig. 5 for the same unitary value as the corresponding curves of u^2 in Fig. 3; the quantity $\left(\frac{l\,u'}{n}\right)$ being used in preference to u as being more readily comparable with u. The numerical values are given in Appendix IV.

The frequency is then altered in the ratio:

$$\left[1 + \frac{\frac{n^2}{l^2}\int_0^l \mathrm{I}\left(\frac{l\,u'}{n}\right)^2 .\, dx}{\int_0^l m\, u^2\, dx}\right]^{-\frac{1}{2}}$$

Appendix III

An estimate can be made of the effect on the period resulting from the varying local displacement due to the motion, by suitably modifying the expression for the potential energy.

If it is assumed that for a large portion of the length the vessel is wall-sided in the neighborhood of the waterline, the increase and decrease of buoyancy force will be, to a first approximation, proportional to the ordinate of the normal function.

This will have the effect of adding a term to the V function of the form $\frac{1}{2}\,\mathrm{F}\,u^2$, where F is the force called into play per unit length. We have, therefore:

$$2\,\mathrm{V} = \int_0^l \mathrm{E\,I}\, u''^2 \,.\, dx + \int_0^l \mathrm{F}\, u^2\, dx$$

The calculation may be simplified and the order of the correction discovered by assuming F constant throughout the length and equal to an estimated mean value.

Appendix IV

Values of $\left(\frac{u}{u\ \text{max.}}\right)^2$

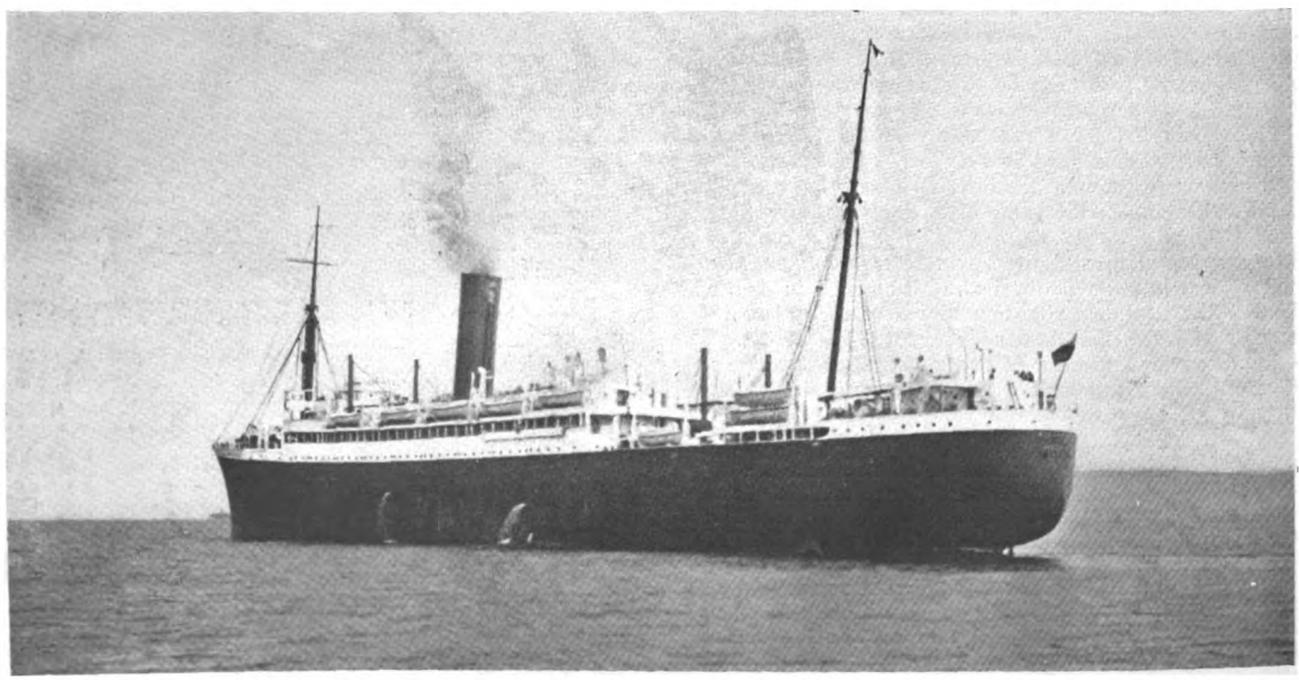
$x/l =$	0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
2-node	1.0000	.5900	.2890	.0980	.0095	.0098	.0740	.1716	.2710	.3435	.3700
3-node	1.0000	.3697	.0517	.0138	.1579	.3422	.4383	.3900	.2333	.0690	....
4-node	1.0000	.2058	.0031	.1950	.4132	.3858	.1575	.0020	.1075	.3613	.5056

Values of $\left(\frac{u''}{u''\ \text{max.}}\right)^2$

$x/l =$	0	0.5	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
2-node	....	.0010	.0142	.0593	.1521	.2953	.4761	.6685	.8397	.9576	1.0000
3-node	....	.0079	.0912	.3162	.6393	.9164	.9950	.8180	.4697	.1364	....
4-node	....	.0267	.2554	.7060	.9990	.8253	.3316	.0078	.1735	.6153	.8687

Values of $\left(\frac{l}{n}\,.\,\frac{u'}{u\ \text{max.}}\right)^2$

$x/l =$	0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
2-node	.9654	.9611	.9350	.8712	.7640	.6184	.4494	.2792	.1333	.0348	....
3-node	1.0000	.9818	.8751	.6525	.3658	.1170	.0024	.1190	.2246	.3995	.4725
4-node	1.0000	.9527	.6975	.3084	.0275	.0570	.3067	.4825	.3901	.1348	....



Twin Screw Passenger and Cargo Steamer Diogenes Built by Harland and Wolff, Ltd., for the Australian Service of the Aberdeen Line: Length, 500 Feet; Beam, 63 Feet; Depth, 35 Feet 3 Inches; Gross Tonnage, 12,300; First Class Passengers, 132; Third Class Passengers, 422; Propelling Machinery, Brown-Curtis Compound Turbines

Generated on 2024-09-12 11:22 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Fig. 1.—A Wall of Water From Six Nozzles on New York City Fireboat Thomas Willett

Testing the New Pumping Equipment of the New York City Fireboat Thomas Willett

ON July 17, tests were made of the new pumping equipment that has been installed on the veteran New York City fireboat *Thomas Willett*. This equipment consists of two 600 brake horsepower Westinghouse steam turbines, of the mechanical drive type, each of which is direct-connected to a 12-inch Lea-Courtney double-suction, volute fire pump.

The average performance of the pumps during the test, which lasted 6 hours, was 9,215 gallons per minute at 150 pounds pressure and 7,410 gallons per minute at 175 pounds pressure, when operated singly, and 4,690 gallons per minute at 300 pounds pressure when connected in series and operated together. In all tests, the Underwriters' requirements were greatly exceeded. The steam pressure was 185 pounds per square inch at the turbine and the suction head 4 pounds per square inch.

The equipment was purchased for the City of New York by Fire Commissioner Thomas J. Drennan. Similar equipment has been ordered to replace the present pumps in the *James Duane*, another fireboat.

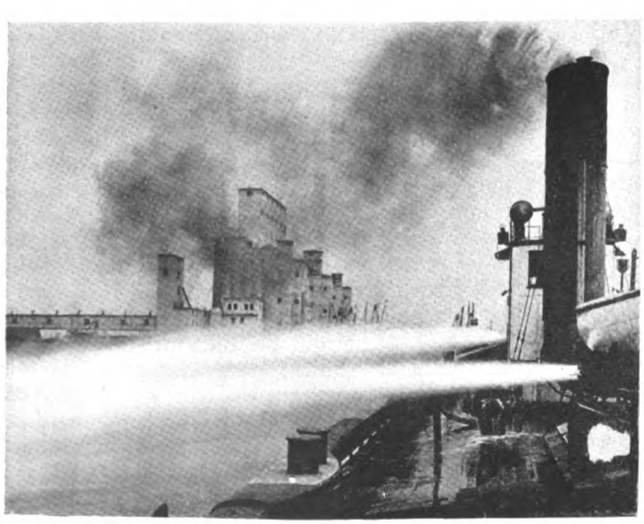


Fig. 2.—High Pressure Test

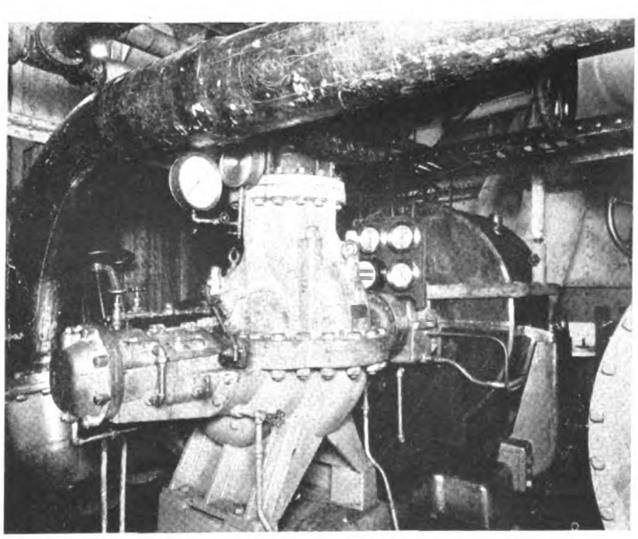


Fig. 3.—600 Horsepower Westinghouse Turbine Driving 12-Inch Lea-Courtney Fire Pump

Generated on 2024-09-12 11:27 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

United States Navy's Research of Ship Bottom Paint

By N. E. Adamson*

Second and concluding installment of an article prepared from the author's notes on research pertaining to ship bottom paints during the past 12 years, augumented by data drawn from the files at the Norfolk Navy Yard, where most of the Navy's research on this subject has taken place. Because of the great volume of data, a brief description of the tests and the history of the research is given rather than a technical discussion of the subject. For obvious reasons the trade names of proprietary paints and materials are omitted. This article was originally read before a committee of the Society for Testing Materials.

FROM 1911 to 1921 was a period of testing various ingredients in bottom paint formulæ designed after the Norfolk formulæ 17 and 19. These tests included approximately 350 preliminary investigations made by submerging steel plates as well as a great number of service tests on ship bottoms, all of these tests being conducted under the writer's observation. In order to follow the data it is well here to insert the formulæ for Norfolk ship bottom paints used at the beginning of this period. They were:

Ingredients	For 100 gallons Anti-corrosive	Anti-fouling
Grain alcohol	74¾ gallons	64 gallons
Gum shellac, Grade A	79½ pounds	137½ pounds
Turpentine	6⅜ gallons	10½ gallons
Pine tar oil	6⅜ gallons	10½ gallons
Zinc oxide, dry	284½ pounds	137½ pounds
Zinc dust	95 pounds	00
Indian red, dry	00	137½ pounds
Red mecuric oxide	00	47½ pounds

An outline of the tests pertaining to each ingredient is as follows:

Testing Ingredients in the Ship Bottom Paints

Since 94 percent pure grain alcohol is obtainable without the payment of internal revenue, it has not been necessary to consider wood alcohol for the sake of cost. The present rate is $0.35 per gallon. However, to prevent tampering with the paint to extract the alcohol for beverage purposes, the alcohol is now denatured by adding a very small percentage of croton oil and a red dye (fuchsin). So far as has been observed this has not affected the properties of the paints.

Gum shellac, a material obtained from India, was once used extensively in commercial ship bottom paints but due to the manner in which it is produced, it being an excretion from certain species of insects, the supply is limited. In 1911 the Navy Department could obtain an ample supply of a very excellent grade in which the flakes were large, clear and hand free. Since that time this grade has been required for other industries and it is now very difficult for the paint manufacturer to get it even if he could afford to pay the price.

The lowering of the grade of gum shellac affects seriously the protective properties of the paint. A test made from September, 1912, to April, 1913, on the bottom of the U. S. S. *South Carolina* showed that bottom paints made with a slightly inferior grade of gum shellac fell off the bottom, while paints made from the better grade did not.

During the past four years efforts have been made to successfully substitute pure garnet lac for gum shellac. These experimental paints would give good results if it were possible to get them applied, but the spirit varnish made from garnet lac acts in a very peculiar way toward the other ingredients. The pigments in the anti-corrosive paint rapidly settle and harden, while the anti-fouling paint congeals within 24 hours to such an extent that it cannot be applied with a brush. It has been found that the addition of approximately one ounce of potassium hydroxide per gallon of paint prevents these peculiarities, but it still remains uncertain whether the hydroxide accelerates corrosion of the steel painted. This matter is still under investigation.

Shellac wax, bee's wax, rosin and pine tar pitch have been used separately and in conjunction with gum shellac or garnet lac and have given negative results. A pure grade of T.N. gum shellac has been tested, but in none of these efforts have results been equal to results from using the high grade gum shellac.

Rosin has especially been of interest because of its low cost and because it is used with apparent success by some of the foreign navies, but rosin, like gum shellac, has many grades. Possibly the right grade has not yet been used in the experiments. The grade that has been used gives a weak film that cracks and softens under water and the paints fail because of rust within three months.

The use of rubber to strengthen the film produced by the lower grade gum shellac in anti-corrosive paint, over which were applied Norfolk anti-fouling or an experimental anti-fouling paint, showed that the rubber had no effect on the anti-corrosive properties but did improve the anti-fouling properties of the paints applied over it. Here it may be stated that in 1907 a naval officer observed that an iron caisson at Pensacola, Fla., had not fouled although it had been in the water several years. This caisson was coated on the underwater part with rubber. Tests made with red gum (Yacca gum) as a substitute for gum shellac gave excellent results.

The use of turpentine (spirits) instead of the cheaper petroleum spirits is not believed to be warranted. During 1913 and 1914 tests on four bottoms, made by quartering and painting diagonally opposite quarters with bottom paints containing petroleum spirits instead of turpentine, failed to show any difference. On one of these bottoms (the U. S. S. *Michigan*) the test was repeated and still no difference was obtained.

Pine tar oil is used in the paints to give slight flexibility to the film. However, pine tar oil contains much free pyroligenous acid which attacks first the metallic zinc in zinc dust used in anti-corrosive paints. In 80 days the paint evolves a volume of gas which, at atmospheric pressure, is equal to the volume of paint. This accounts for the tendency of the anti-corrosive paint to be forced out of leaks around the filling hole of containers. The paint cannot successfully be stored in wood barrels for the same reason.

Pine oil has been used with varying degrees of success as a substitute for the pine tar oil, the turpentine and a part of the alcohol. From a technical standpoint such paint is better than the Norfolk paints, but the odor of the pine oil is obnoxious. The men applying the paint complain of its effect. This probably accounts for its use being abandoned after several vessels had been painted.

It would be highly desirable to substitute for the pine tar oil in the Norfolk formulæ an oil which would give the same flexibility to the film and which would be free of acids and

* Assistant shop superintendent, United States Navy Yard, Norfolk, Va.

Generated on 2024-09-12 11:34 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

disagreeable odor. Castor oil, used to the extent of 2 gills per gallon of paint, causes blistering of the film, but these small blisters do not seem to be detrimental. The Norfolk paints containing the castor oil are superior, during the first seven months' service. Boiled linseed oil, used in the same way the castor oil was used in the paints, gives negative results. The films crack and rust starts within two months.

A medium grade of zinc oxide (American XX) is used in Norfolk paints but a slightly leaded zinc has proven equally as efficient so far as results on submerged plates show. The sulphate of lead in the leaded-zinc should not exceed ten percent. When thirty percent sulphate of lead, leaded-zinc is used the results are negative and the paint pigments settle hard in the containers. It would seem desirable from the standpoint of cost and improvement of the quality of paint to reduce the amount of zinc oxide and add an inert pigment such as silica. Silica, as will be mentioned later, is an excellent pigment for ship bottom paints.

Zinc dust is supposed to be the ingredient in the anti-corrosive paint which prevents corrosion. The electrolytic theory for rust is adhered to in this supposition, it being held that the metallic zinc which constitutes 85 percent of the zinc dust, being electro-positive to iron, forms galvanic couples to prevent the rust. If this supposition is correct, as it seems to be, it would seem to be desirable to increase the proportion of zinc dust. It has been noted that rust is usually prevented as long as the particles of zinc dust are present in the film and that rust starts soon after these particles have disappeared. Powdered metallic zinc gives better results than zinc dust, which is only 85 percent metallic zinc, but is expended more rapidly. The original Norfolk formula required a larger proportion of zinc dust (metallic zinc) and apparently produced a better paint than the present standard. Of course there is the ever present liability of zinc dust to spontaneous combustion, a feature that should be considered separately from a discussion of this character.

Indian red is possibly the least influential ingredient in the bottom paints, yet there are possibilities of much being done in the selection of the proper quality. Several kinds have been tested, some giving slightly positive and some decidedly negative results. It is believed that the success of the British Navy paints is due in part to a fortunate selection of their iron oxide pigment which is obtained from ore mined in England. Again, it may be that Indian red is altogether the wrong pigment to use with the zinc oxide because a weak galvanic action is set up between particles of the two pigments but it is used in Norfolk anti-fouling ship bottom paint to give body and to make the color distinctly different from the anti-corrosive paint, the latter property being highly desirable for insuring that all parts of the ship's bottom are coated.

Finally the toxine, mercuric oxide, is to be considered. Compounds of mercury are used, or have been used, in most anti-fouling paints for steel bottoms. Only red mercuric oxide was once used in Norfolk anti-fouling, but of recent years red or yellow mercuric oxide has been used as the toxic qualities of the two, so far as service is concerned, seem to be equal. Originally 47½ pounds per 100 gallons of paint were used but this has been increased so that now 75 pounds per 100 gallons of paint are used. This change occurred in August, 1914, after considerable testing on ship's bottoms as well as on submerged plates.

Mercuric oxide is a very heavy pigment, its specific gravity being entirely out of proportion to all the other ingredients of the paint. This causes the pigment to settle rapidly and, in order to get an approximately even distribution of the pigment on a bottom, it is necessary to do much stirring both before the paint is taken from its shipping container and after it is poured into buckets from which it is applied. After the paint is applied there is only a shellac film holding it and as the shellac film usually softens in 48 hours after submersion it is reasonable to expect that much of the mercuric oxide is then lost.

During November, 1914, the bottom of the U. S. S. *Paulding* was found to be clean of fouling except for scattered bunches of hydroids about five inches long. The paint under these hydroids was found to be free of mercury.

Copper salts have been considered unsuitable on steel hulls because of the known effect of the presence of metallic copper adjacent to submerged surfaces of steel (or iron). However, some very interesting results have been obtained when using copper salts instead of mercuric oxide in Norfolk paint. From May to October 1921, a submerged plate showed that cuprous oxide would not prevent barnacles from becoming attached, but the experimental film remained harder and freer from rust than did the standard film. Copper cyanide gave slightly positive results during a ten-month (January to October) submersion test, but the film showed early blistering followed by small beads of rust. When copper cyanide was used as the toxine in a formula varying greatly from the Norfolk formula the results were decidedly negative and the film caught the first crop of barnacles and hydroids.

Arsenic trioxide and orpiment have also been tried and gave negative results. The former is possibly too soluble in water and the latter gave fair results for two months (February and March) but was not effective as a toxine when the barnacle season opened.

Paris green has been tried in a number of tests. It is a most excellent pigment and toxine but unless it is supplemented with mercuric oxide, or an equivalent toxine, it does not prevent fouling. When so supplemented the results are decidedly positive. Its relative cheapness permits its use as a part of the body pigment and as such it is quite suitable.

Mercuric linoleate, copper linoleate, zinc cyanide and cuprous hydrate have been tested in a preliminary way, in one submerged plate test, and each has failed to prevent fouling by barnacles.

The conclusion can logically be drawn that in order to prevent fouling by poisoning it is necessary to use a toxine for organisms of the animal kingdom and a toxine for organisms for the vegetable kingdom. So far as the writer's experience goes no one substance has been found toxic to both that can be used effectively in an anti-fouling ship bottom paint. This statement does not take into consideration those paints which prevent fouling by exfoliation, with which very little experience has been had. One test has been made with a heavy petroleum grease applied over bottom paints. The grease was supposed to prevent attachment of fouling by preventing secure attachment. The results were negative and the grease caused the anti-fouling paint beneath to crack and flake.

In December, 1915, an effort was made to analyze the results from approximately 75 tests to determine the relative merits of various pigments used. The tests were made on submerged plates, each being examined monthly for eight months. Two coats of anti-corrosive paint and one coat of anti-fouling paint were applied in each case. The results were graded on the basis of ten being perfect and the average grade for each pigment was determined as the average grade on all paints in which the pigment was used. The same vehicles as are used in Norfolk paints were used in most of these tests. The results were:

Pigment	Anti-corrosive	Anti-fouling
Zinc oxide	4.2	3.74
Silica	5.2	3.65
Blanc-fixe	4.	5.2
Artificial vermillion	3.11	2.87
Indian red	..	3.2
Orpiment	..	4.86
Paris green	..	5.4
Proto oxide of copper	..	4.1

These grades indicate that silica is an excellent pigment for an anti-corrosive paint and that blanc-fixe is an excellent

Generated on 2024-09-12 11:24 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

pigment for anti-fouling paint. They also indicate that Indian red is not a desirable pigment for anti-fouling paint. Red lead in an oil paint, in a flat paint and in a spirit varnish paint has been tried as a primer for anti-fouling paint; that is, as an anti-corrosive paint. It has also been tried in combination with basic sulphate of lead. In all these tests the results have been negative. However, red lead oil paint applied on hulls while building, and which has at least three months to dry before ship bottom paints are applied, gives better results.

Tests of Vehicles

The determination of the proper vehicle for ship bottom paints is equally as important as the determination of the proper pigments. Some effort has been given to determine the proper ratio of gum shellac to volatiles, but the data obtained are not sufficient upon which to base a conclusion. It is believed, however, that the ratio should be greater for anti-fouling than for anti-corrosive paint. The anti-fouling must hold heavy toxines and must assist in binding the anti-corrosive paint's pigments to the ship's bottoms. Other kinds of vehicles have been tested, for example, an anti-corrosive paint in which a linseed oil product was used with Portland cement as the pigment. The results were excellent, but the drying time was prohibitive. The linseed oil compound used without pigment (as a waterproof coating) and applied next to the steel gave poor results.

Chrome yellow used with this oil compound formed an excellent anti-corrosive paint, but dried too slowly. Chrome yellow used in a spirit varnish anti-corrosive gave poor service.

Asphalts were used as the binder for anti-corrosive and anti-fouling paints on one plate and all the paint came off within three months. Asphalt bottom paint tests made at a naval station in the Philippine Islands gave much better results. Coatings of shellac between the anti-corrosive and anti-fouling paints prove ineffective.

One very interesting test of an intermediate varnish coat was made by applying a hard gum varnish over the seams and rivets of a bottom before applying Norfolk anti-fouling paint. When the vessel was again docked it was clean of fouling except where the hard gum varnish had been applied. Here was found a heavy growth of hydroids and crustaces where the varnish had caused the anti-fouling paint to check and fall off. The bottom had a checker board appearance.

Whatever type vehicle is selected for the anti-fouling paint, the same type vehicle should be used in the anti-corrosive paint. There should not be a marked difference in elasticity between the two paint films.

Combination Ship Bottom Paint

It was suggested above that possibly the properties of an anti-corrosive and of an anti-fouling ship bottom paint could be combined in one paint. The belief that this can be done is based upon the fact that it is the built-up film on a bottom that gives the best protection. By built-up film is meant that film produced by applying fresh paints over old paints. When a ship is placed in drydock the slime and fouling are removed. This can usually be done by washing or by scraping with square point shovels. The paint adhering to the bottom is not removed. The bare spots are then touched up with anti-corrosive paint, after which the bottom is given one or two complete coats of anti-corrosive over which is applied the anti-fouling paint. In time there is built up a comparatively heavy coating of paint consisting of alternate layers of anti-corrosive and anti-fouling. If a coating consisting of layers of different paints gives good service, why would not a coating in which the different paints are more thoroughly mixed give good services?

Often a ship bottom is painted when it is in a fair condition in order to assure that the condition will be maintained until the time for the next docking. One coat of anti-corrosive and one coat of anti-fouling is the minimum that can be applied to protect against both rust and fouling. If a combination paint were available one-half of the labor and time could be saved by applying one coat of the combination paint. The demand for such a paint is great. When it is produced, and eventually it will be produced, the ship bottom paint trade will have to conform to the demands.

The following formula has been tested on a submerged plate from July to January, during which period two coats of it gave better service than did two coats of Norfolk anti-corrosive and one coat of Norfolk anti-fouling paints. The combination paint film was hard and clean of fouling and rust at the end of six months' exposure.

To make 25 gallons:

Grain alcohol	13¾	gallons
Gum shellac	40	pounds
Pine oil	2½	gallons
Zinc oxide	30	pounds
Silica	30	pounds
Blanc-fixe	30	pounds
Paris green	15	pounds
Mercuric oxide	10	pounds

This paint weighs approximately 11 pounds per gallon, and dries equally as fast as do the Norfolk paints. It should be borne in mind, however, that this formula has been tested on only one submerged plate. It has not been tested on a ship's bottom.

Referring again to the merit of a built-up film, it can be stated that in making tests attention should be given to the effects produced by a built-up film. It is not sufficient to condemn a paint because the first coats on a steel plate do not prevent rust for a period of six months. The test should be continued by removing the rust and fouling and repainting. In this way a film is built up which possibly will give the desired service. Again, when painting sections of a bottom with an experimental paint, the results from the first painting are often not due entirely to the experimental paint, but to the built-up film consisting of the experimental paint and the paints previously used. These facts are so elementary that wonder is had at conclusions sometimes drawn from tests.

Tests Now in Progress

During the past ten months there has been a renewed activity in tests of ship bottom paints. Preliminary tests, to find suitable vehicles other than the present standard vehicle, indicate that aeroplane dope is not suitable. A spar varnish containing both linseed and tung oil apparently is unsuitable and an ester resin, dissolved in benzol, presents some likelihood of having merit, but the tests have not advanced sufficiently to warrant any conclusion.

A series of interesting tests is in progress at Beaufort, North Carolina, where the Navy has a chemist stationed temporarily in the Bureau of Fisheries Laboratory. These tests will be continued on steel plates submerged at the Norfolk Navy Yard.

Other tests are being made of ship bottom paints having barium salts as the toxine and several vessels are now painted with such paint on two quarters of the bottom.

In addition copper cyanide is being further investigated as is also cuprous oxide.

Conclusion

The problem of finding the best formulæ is an intensely interesting one and the solution is not found when a pigment or pigments are found which are toxic to all forms of marine growth. An effort has been made in the foregoing to show that the problem covers physical as well as chemical properties of the paint film.

In 1906 the Navy used approximately 25,000 gallons of ship bottom paint. The Navy now uses approximately 200,000 gallons of ship bottom paint per year.

A recent review of reports during the past 4 years showed

Generated on 2024-09-12 11:27 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

that the effectiveness of the anti-corrosive paint is good for a period of from 12 to 18 months and the effectiveness of the anti-fouling paint is good for 9 months. Considering averages, vessels out of dry dock nine months are in as good condition as those out of dock only six months.

Corrosion develops slowly between the twelfth and eighteenth month and rapidly after that.

These periods are suggested from the records of 303 examinations; 134 for vessels out 6 months, 64 for vessels out nine months, 66 for vessels out 12 months, 27 for vessels out 18 months and 12 for vessels out 24 months. The records cover all types of vessels plying in all waters traversed by United States Naval vessels.

RESULTS OF EXPERIMENTS

Table 1 contains information of tests conducted at the Norfolk Navy Yard with 21 experimental paint compositions. Some of these paints were tested on submerged steel plates, some on the bottom of launch number 270 and others on the bottoms of coal barges numbers 69 and 74.

The submerged steel plates were painted with two coats of anti-corrosive paint and one coat of anti-fouling paint. The results were:

Formulæ	Period of Submersion	Results
No. 1 A. C. and No. 2. A. F.	May 30, 1906 to July 30, 1906	Poor. Paints soft and covered with barnacles and rust cones.
No. 1 A. C. (No anti-fouling)	May 31, 1906 to July 30, 1906	Poor. Covered with rust, barnacles and grass.
Commercial brand A. C. and A. F.	May 31, 1906 to July 30, 1906	Fair. Few barnacles, no grass, slight rust.
Commercial brand A. C. and A. F.	May 31, 1906 to Dec. 20, 1906	Many large barnacles. Much corrosion in form of black oxide. Paints soft.
No. 3 A. C. and No. 4 A. F.	June 14, 1906 to Dec. 20, 1906	Paint soft. Few scattered barnacles and large rust cones. No grass.
No. 5 A. C. and No. 4 A. F.	June 21, 1906 to Dec. 20, 1906	Large cracks in film in which rust developed. No other rust on plate. No barnacles. No grass.
No. 6 A. C. and No. 7 A. F.	Aug. 9, 1906 to Dec. 20, 1906	Few barnacles. Little grass. Much slime. Small amount of rust. Oil sweats out of film. Paint soft. Fair condition.
No. 12 A. C. and No. 13 A. F.	Sept. 21, 1906 to Dec. 20, 1906	Slight blistering. No rust. No fouling.
No. 20 A. C. and No. 21 A. F. (plate polished)	Oct. 20, 1906 to Dec. 20, 1906	No fouling. Rust cones started. Slight pitting noted after the paint was removed.

Launch No. 270 was painted September 4, 1906, and the bottom examined December 22, 1906. The bottom had been galvanized but the galvanizing had worn off at the time of the test. Sections 12 feet long extending from the waterline to keel on one side were used for these tests. The results were:

Formulæ	Results
No. 3 A. C. and No. 4 A. F. (HgO added to 2nd and 3rd coats)	No rust. No grass. Few barnacles. Paint in excellent condition when first taken out of water but began to peel in 24 hours after exposure to air.
No. 5 A. C. and No. 9 A. F.	Few barnacles. No grass. Few rust cones where paint was chipped off. Paint scales when exposed to the air after submersion.
No. 3 A. C. and No. 4 A. F.	Conditions about the same as first item. There were small rust cones where paint was chipped off.
No. 5 A. C. and No. 9 A. F.	Numerous barnacles and moderate amount of grass. No rust. Paint hard and did not scale on exposure to air.
No. 10 A. C. and No. 11 A. F.	No rust. No grass. Few barnacles. Paint hard but scaled upon exposure to air after submersion.
Commercial brand A. C. and A. F.	Paint off from numerous spots, but remaining paint was hard. General corrosion started. Numerous rust cones. Numerous barnacles, moderate amount of grass. Paint does not scale on exposure to air.

GENERAL COMPARISON

The anti-fouling test paints, with the exception of Number 9, were effective. All the paints were less effective at the waterline than well below the waterline. Where submerged all the test paints proved superior to the commercial paint. All the paints scaled on exposure to air, after submersion, except those designated as Numbers 5 and 9 and the commercial paint.

Coal barge Number 69 was painted September 23, 1906; examined January 18, 1907, and again on October 3, 1907. It was sunk in Hampton Roads April, 1907, and raised October 1, 1907. The test paints were damaged and much of the fouling removed by passing chains under the barge to raise it. The test sections were 8 feet long and extended from the load waterline to the turn of the bilge on both sides. The results were:

Sec. Formulæ	Condition Jan. 18, 1907	Oct. 3, 1907
(1) No. 3 A. C. and No. 4 A. F.	Paint hard; slightly scaled. Many small barnacles and slight amount of grass.	Fair condition. Very small amount of rust. A moderate amount of small barnacles and scattered bunches of grass.
(2) Commercial brand A. C. and A. F.	Covered with small barnacles and short grass. Paint off in some spots.	Very bad condition. Dense growth of small barnacles, clams and worms. Practically no grass. Considerable rust.
(3) No. 14 A. C. and No. 4 A. F.	Few barnacles and small amount of grass. Paint hard but scaling at water line.	Conditions much better than on section 2. The anti-corrosive better than that on section 1. About equal to section 1 as to fouling.
(4) No. 15 A. C. and No. 4 A. F.	No grass. Very few barnacles. Paint hard and in good condition.	Same conditions as on section 3.
(5) No. 16 A. C. and No. 4 A. F.	Approximately same condition as and slightly better than, section 4.	Conditions similar but slightly superior to conditions on sections 3 and 4.
(6) No. 17 A. C. and No. 4 A. F.	Few barnacles. No grass. Paint in excellent condition.	Conditions very similar to conditions on sections 3, 4 and 5.
(7) No. 3 A. C. and No. 4 A. F. (Same as sec. 1)	Condition approximately same as section 1, but slightly worse as to scaling.	No report.

The order of merit on January 18, 1907, was sections 2, 7, 1, 3, 4, 5 and 6, section 2 being the worst condition and 6 the best condition.

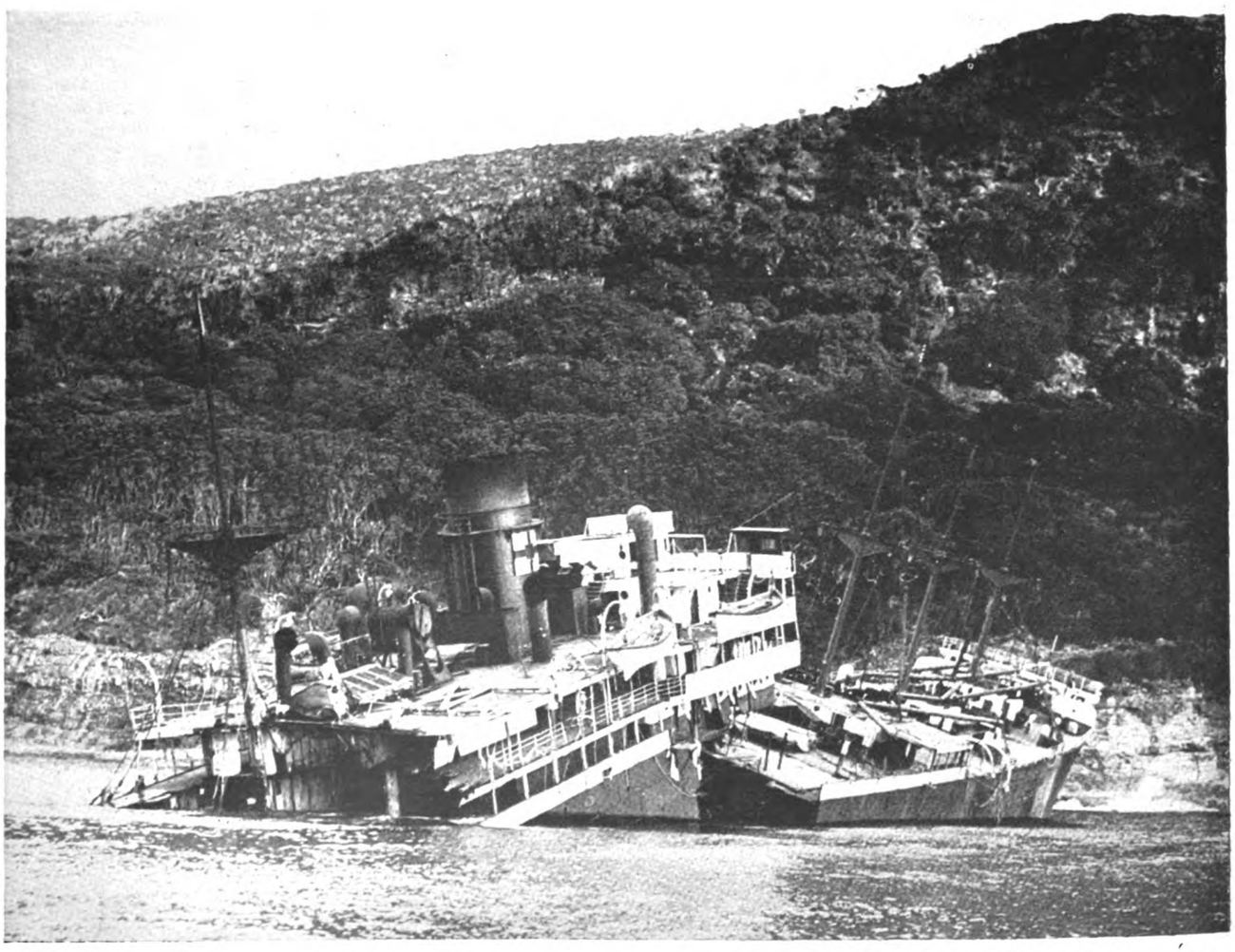
Coal barge Number 74 was painted October 1, 1906, and was examined February 21, 1907, and October 3, 1907. The bottom was sectioned similarly to the bottom of coal barge Number 69 described above. During most of the period of test the barge was moored at the Norfolk Navy Yard. It was used in raising coal barge Number 69 when the experimental paints were more or less damaged by chains. The conditions were:

Sec. Formulæ	Condition Feb. 21, 1907	Oct. 3, 1907
(1) Commercial brand A. C. and A. F.	Paint scaling. Almost covered with small barnacles, some grass and much slime.	Most of paint disappeared. General corrosion and pitting. Dense growth of grass with scattered barnacles.

Generated on 2024-09-12 11:26 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Sec. Formulæ	Condition Jan. 18, 1907	Oct. 3,1907
(2) No. 14 A. C. and No. 19 A. F. (with bitter aloes added to A. F.)	No scaling below water line. No rust. Many small barnacles but not so many as on section 1. Film hard. Scaling at water line.	Paint hard. Very good anti-corrosive paint. Anti-fouling in fair condition. Much better than on section 1.
(3) No. 15 A. C. and No. 19 A. F. (with arsenious acid added to A. F.)	Very slight scaling at water line and no scaling below water line. Less barnacles than on section 2. No grass. Film hard.	Paint hard. Very good anti-corrosive paint. The anti-fouling was not equal to that on section 2 but better than that on section 1.
(4) No. 16 A. C. and No. 19 A. F.	No scaling. Rust cones where paint had been scraped off (shell plate dented here showing collision had occurred). More barnacles than on section 3. No grass and but little slime.	Paint hard. The best of the anti-corrosive paint. Anti-fouling paint in fair condition; much better than that on section 1.
(5) No. 17 A. C. and No. 19 A. F.	Practically same condition as section 4.	Paint hard. Very good anti-corrosive paint. Anti-fouling paint in fair condition; much better than that on section 1.
(6) No. 3 A. C. and No. 4 A. F.	Considerable scaling. Rust cones where paints had been scraped off. Very few barnacles. No grass.	Condition of anti-corrosive paint is only fair, inferior to that on sections 2 and 5. Anti-fouling paint in fair condition much better than that on section 1.
(7) No. 18 A. C. and No. 19 A. F.	Considerable scaling. Numerous blisters. Fouling about same as sections 4 and 5.	Poor anti-corrosive but better than the commercial brand. Condition of anti-fouling paint fair; much better than that on section 1.

The best anti-corrosive paints (February 21, 1907) were Numbers 16 and 17; the most inefficient anti-corrosive was Number 18. The best anti-fouling paint (February 21, 1907) was Number 19 with arsenious acid added (section 2).



(Photograph from Keystone View Company, Inc., N. Y.)

The Wreck of the Wiltshire

The English Federal steamer Wiltshire was recently stranded on the Great Barrier Island of New Zealand, Australia. During a severe storm while she was stranded, the vessel broke in half and disabled the wireless apparatus, but the crew was able to communicate with the shore by semaphore signalling, and after forty hours was brought ashore. The photograph shows the condition of the vessel after the crew was rescued.

Generated on 2024-09-12 11:25 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Insulating Materials for Shipbuilding Purposes—II

By Horace Holden Thayer*

Continuation of a series of articles containing information regarding shipbuilding materials and their uses that is not readily obtainable from shipbuilding handbooks and other generally available sources. The articles are not intended to be a complete exposition of the subject but will be found to contain items of value to the various classes of workers in this field who have to deal with these materials from the materials point of view.

MINERAL wool is fibrous material formed by blowing molten slag or rock into threads by means of a jet of steam or air. Other names are mineral cotton, slag wool, rock wool and silicate cotton. The product made from rock is the best.

Mineral Wool

Mineral wool made from slag contains a small amount of sulphur unless the molten slag has been specially desulphurized, and such wool should therefore not be used as packing around steelwork on shipboard or as a covering for steel pipes or other steel containers. Access of water to mineral wool containing sulphur may result in the formation of sulphuric acid, with attendant rapid corrosion of the steel.

One manufacturer liquifies silica bearing limestone rock at a temperature of 3,500 degrees F. and blows this liquid rock into fine threads by means of a steam blast. The threads on their way to a cooling chamber are passed through oil vapor, which makes them soft and pliable and removes the minute particles of stone dust. The product looks much like cotton linters. A cubic foot of this rock fiber wool contains 8⅓ percent rock fiber and 91⅔ percent of entrapped air when packed to a weight of 14 pounds per cubic foot.

The chief field for mineral wool is the insulation of refrigerated cargo spaces. It is also of value for packing in between deck beams wherever the underside of a deck has to be insulated, as when the ship's cold storage rooms are over the machinery space.

Specifications for the material should require it to be of good quality, reasonably free from shot and other deleterious matter. Small globules of glass or stone not properly blown into threads are called shot.

Hair Felt

This material is felted cattle hair. It has high insulating properties and is considerably used for covering ammonia and brine pipes. It can be obtained in rolls in thicknesses from ¼ inch to 2 inches, and can be built up on the pipes.

Specifications should call for the best commercial grade used for pipe-covering insulating purposes.

A sectional covering is available suitable for cold water piping to keep the water cold and also to guard against condensation on the pipes. It is made up in standard sections, molded and compressed over a lining of waterproof paper. It is canvas jacketed and fitted with bands for fastening. A thickness of ¾ inch will answer for this service.

There are special coverings made of hair felt and other materials, some of which are very efficient.

Wool Felt

This is made up as a pipe covering in the same manner as hair felt, and the same remarks apply. The covering for hot pipes has been referred to. For cold pipes it has an inner lining of waterproof saturated felt.

In some cases the plain wool felt covering has all surfaces coated with a waterproof preparation, so that moisture will not get to the wool felt.

A more waterproof type of covering is made of alternate layers of wool felt and waterproof paraffin paper with an inner lining of paraffin paper.

There are also special combinations of wool felt and other materials in layers.

Vegetable Fiber Products

Some of these products have been found to fulfill shipboard requirements as refrigerating insulation. As stated under the head of heat retaining insulation, any of them which may be presented for consideration can be readily examined for everything except durability and the character of the ingredients is a good guide to that.

One of these products is waterproof lith, which is composed of 40 percent by volume of flax fibers, 58 percent of the limestone rock wool referred to under the head of mineral wool, and 2 percent of a waterproofing compound. It comes in boards 18 inches by 48 inches, from ½ inch to 3 inches thick. It weighs about 1⅓ pounds per square foot 1 inch thick and 3½ pounds 3 inches thick. It is a substitute for corkboard in service for which corkboard is the standard material.

The above product is also made up into sectional covering for pipes and fittings, using the same materials but specially selected and made somewhat more dense. The surfaces are coated with a waterproof compound. The thicknesses for the different services are the same as given under the head of cork pipe covering except that the ice water covering averages 1¼ inches thick.

Another product, linofelt, has been explained under the head of heat retaining insulation. Its particular field is small refrigerated rooms and ice boxes.

The nature of insulating paper has also been explained under the head of heat retaining insulation. Its principal value in refrigerating insulation work is to prevent losses due to joints in the main insulating materials.

Method of Use

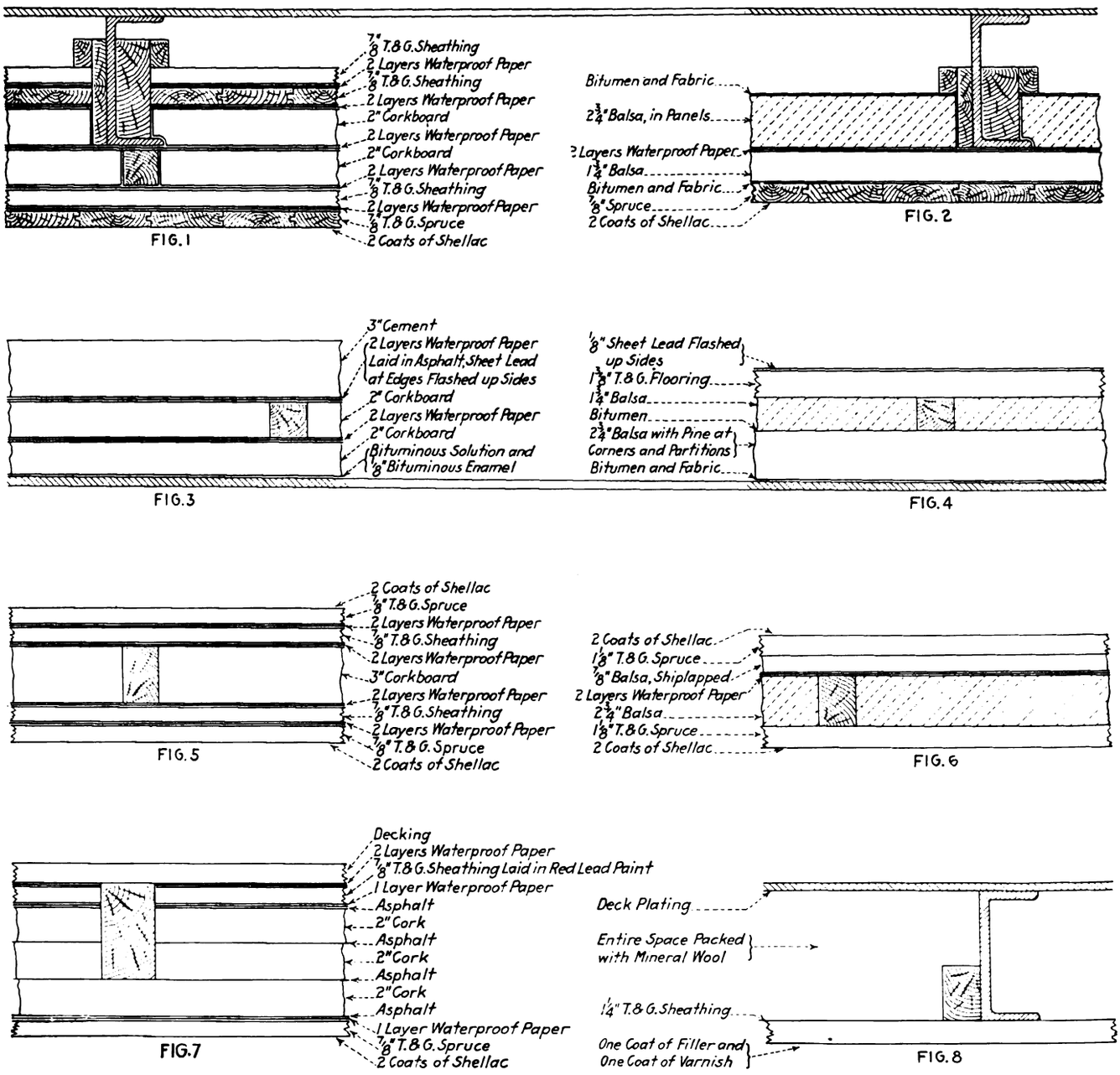
The accompanying illustrations give a general idea of the way refrigerated spaces are insulated on shipboard. Figs. 1 to 7 show typical installations for meat and vegetable rooms, the former being generally kept at a temperature of 20 degrees F. and the latter at 40 degrees F. Fig. 8 shows a typical installation in the cargo space of a refrigerated ship.

Figs. 1 and 2 represent either the under side of the deck or the side of a steel ship and afford a comparison in the construction with corkboard and with Balsa wood. The saving in wood sheathing with the latter is very apparent. The stiffener side of steel bulkheads calls for the same general layout except that when the stiffeners are angles it is usually better to run the corkboard or other insulating material entirely clear of the stiffeners.

Figs. 3 and 4 represent the insulation on a steel deck and also afford a comparison between the corkboard and Balsa wood constructions. The top coverings could of course be the same in each case and might differ from either of those shown. A cement covering on top of the Balsa wood in place of the wood flooring calls for the use of waterproof paper as shown for the corkboard insulation.

* Member of the firm of Rossell & Thayer, naval architects and marine engineers, Philadelphia, Pa.

Generated on 2024-09-12 11:55 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN



Methods of Insulating Refrigerated Spaces on Board Ship

Figs. 5 and 6 represent partition bulkheads.

Fig. 7 represents corkboard insulation as applied to the under side of a wood deck, the beams being of such size as to make this method work out to better advantage than a layout similar to that of Fig. 1. The bitumen between the layers of corkboard is recommended by the corkboard manufacturers in preference to the waterproof paper. It is mopped on hot.

Fig. 8 represents the construction where mineral wool is used. The wood grounds are fastened to the frames or beams at the necessary distance from the plating to allow of the thickness of insulation called for, in some cases extending beyond the framing and making a packing space greater than the depth of the framing. A typical schedule covering the principal items of refrigerating insulation for the cargo spaces of a frozen meat carrying steamer, where mineral wool is used and where the temperature has to be maintained at not over 15 degrees F. under tropical conditions is—

Ship's sides	12 inches of mineral wool.
Underside of weather deck	10 inches of mineral wool.
Underside of second deck	8 inches of mineral wool.
Tank tops	6 inches of cork in two layers.
Machinery space bulkheads	11 inches of mineral wool.
Intermediate bulkheads	4 inches of mineral wool on the smooth side; the depth of the stiffeners on the stiffener side.
Shaft tunnel	10 inches of mineral wool.

In cases where the insulation under a deck is in the machinery space it is desirable to apply 2 inches of 85 per-cent magnesia or equivalent insulation below the wood sheathing, with an outer facing of thin galvanized iron.

Waterproof lith of the necessary thickness may be substituted for corkboard in the illustrations, and its manufacturers recommend a heavy bitumen coating mopped on hot between layers of this material rather than waterproof paper, although approving the paper as a substitute for the bitumen between the lith and wood sheathing.

Miscellaneous Heat Resisting Insulation

Insulation that is of value to retain heat is naturally or value to exclude it, so that a consideration of miscellaneous heat resisting insulation resolves itself mainly into pointing out which of the materials heretofore dealt with can be used

Generated on 2024-09-12 11:27 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

to advantage for such service. They will therefore be referred to under the head of some of the more important services of this character.

Underside of Wood Decks Over Boilers

The nature and extent of the insulation depends upon the closeness of the woodwork to the boilers and the air circulation in way of it. A typical installation for severe conditions consists of 1½ inches of 85 percent magnesia blocks set 2 inches clear of the wood and protected and secured in place by light galvanized iron. Other non-combustible insulation equivalent to the 85 percent magnesia could be used.

Inside of Engine and Boiler Casings

The protection in way of the stack might be as specified above for decks over boilers, with reduced thickness at the ends of the casings. Two-inch corkboard is used in some cases.

A good insulation for casings that are pretty well ventilated consists of 1 inch thick asbestos paper air cell blocks covered with galvanized sheet iron. The fastenings are run through 1 inch thimbles to prevent crushing the insulating material and the heads of the fastenings are completely soldered over.

Living Rooms Near Heated Spaces

The floors of staterooms or other accommodations over boiler rooms or galleys on steel ships can be protected in the manner illustrated by Figs. 3 and 4 for refrigerated rooms. A single layer of 1-inch cork will usually be sufficient, laid in bituminous solution and enamel as shown, with two layers of insulating paper and the required wood or composition deck covering on top. As stated in the article on "Deck Coverings"* the latter covering cannot be successfully used on steel decks which are exposed to excessive heat without some protection from that heat.

Joinerwork of accommodations in way of engine and boiler casings or galleys can be insulated by any of the good vegetable fiber products that are sufficiently fireproof as well as the materials which are primarily intended for more severe service.

Protection in Way of Stove Pipes, Stoves, Radiators, Etc.

Asbestos millboard is the usual material for such service and it is usually necessary to protect it from damage by a covering of sheet metal. A thickness of 1/16 inch is sufficient.

Engineer's Consumable Stores

It is customary to have in the engineer's consumable stores a small supply of some of the insulating materials used on board of the ship together with the other materials necessary for their proper installation. The latter have been referred to under the head of some of the coverings and those references should be understood generally to apply to substitute coverings of like nature. Such a supply for the usual run of cargo steamships would be about as follows:

Fire bricks, assorted sizes as required	About 200.
Fire clay or high temperature cement	200 pounds.
Poultry wire, iron, 2-inch mesh, No. 14 B.W.G., annealed	10 pounds.
Asbestos plaster, two bags	100 pounds.
Asbestos cement, hard finish, one bag	50 pounds.
Asbestos millboard, 40-inch by 40-inch by ¼-inch thick	4 sheets.
8-ounce canvas for pipe covering	10 square yards.
Unbleached muslin for pipe covering, 2½ square yards per pound	25 square yards.
Cotton twine for pipe covering, No. 6, 1,000 yards per pound	one ½-pound ball.
Smooth-on	5 pounds.

*See MARINE ENGINEERING AND SHIPPING AGE, March and April, 1922.

Table I—Thermal Conductivities of Various Insulating and Building Materials

All the figures given below, with the exception of the first two, are the results of measurements made at the Bureau of Standards, Washington, D. C., on representative samples of materials. They represent actual internal conductivities, surface effects having been eliminated. The mean temperature of the determination was about 77 degrees F., and the temperature differences used varied from 50 to 77 degrees F.

K is the thermal conductivity in B.T.U. per square foot per inch of thickness per degree F. difference in temperature per 24 hours.

Material	Description	K	Pounds Per Cubic Ft.
Vacuum	Silvered vacuum jacket—residual air about 0.001 m.m. Hg	0.1	...
Air	Ideal air space—if radiation or convection could be prevented	4.2	0.08
Calorox	Fluffy finely divided mineral matter	5.3	4.0
Kapok	Imported vegetable fibre—loosely packed	5.7	0.88
Pure wool		5.9	6.9
Pure wool		5.9	6.3
Hair felt		5.9	17.0
Pure wool		6.3	5.0
Keystone hair	Hair felt confined with building paper—flexible	6.5	19.0
Mineral wool	Loosely packed	6.3	12.0
Mineral wool	Medium packed	6.6	12.5
Corkboard	No artificial binder—low density	6.7	6.9
Mineral wool	Felted in blocks	6.9	18.0
Cotton wool	Loosely packed	7.0	...
Pure wool		7.0	2.5
Insulite	Pressed wood pulp—rigid	7.1	11.9
Mineral wool	Firmly packed	7.1	21.0
Linofelt	Vegetable fibre confined with paper—flexible and soft	7.2	11.3
Ground cork	Ordinary	7.1	9.4
Corkboard	No artificial binder—high density	7.4	11.3
Celite	Diatomaceous earth powder	7.4	10.6
Granulated cork	About 3-16 inch	7.5	8.1
Balsa wood	Very light wood untreated—across grain	7.5	7.1
Balsa wood	Same sample with 13 percent waterproofing compounds	8.3	8.0
Cotton seed hull fiber	Loosely packed	7.5	4.4
Cabot's quilt	Eel grass enclosed in burlap	7.7	16.0
Flaxlinum	Felted vegetable fibres — firm and flexible	7.9	11.3
Fibrofelt	Felted vegetable fibres — firm and flexible	7.9	11.3
Rock cork	Mineral wool and binder—rigid	7.9	16.0
Ceiba wood	Untreated—across grain	7.9	7.1
Balsa wood	Light wood—untreated	8.3	7.4
Corkboard	Bituminous binder	8.4	16.0
Wood felt	Flexible paper stock	8.7	21.0
Lith board	Mineral wool vegetable fibres and binder—rigid (different somewhat from waterproof lith)	9.1	12.5
Balsa wood	Medium weight wood	9.2	8.9
Planer shavings	Various	10.0	8.8
Wall board	Stiff pasteboard	11.0	...
Air cell ½ in.	Corrugated asbestos paper enclosing air spaces	11.0	8.8
Air cell 1 in.	Corrugated asbestos paper enclosing air spaces	12.0	8.8
Asbestos paper	Asbestos and organic binder	12.0	31.0
Zenitherm	Diatomaceous earth and asbestos—rigid	11.8	16.0
85% magnesia	Magnesia and asbestos—rigid	12.2	19.0
Insulex	Asbestos and plaster blocks—very porous	13.5	18.0
Diatomaceous earth	Natural blocks	14.0	43.0
Balsa wood	Heavy wood	14.0	20.0
Fire felt sheet	Asbestos sheet coated with cement—rigid	14.0	26.0
Fire felt roll	Soft, flexible asbestos sheet	15.0	43.0
Cypress	Across grain	16.0	29.0
Fullers earth	Argillaceous powder	17.0	33.0
Asphalt roofing	Felt saturated with asphalt	17.0	55.0
White pine	Across grain	19.0	32.0
Asbestos millboard	Pressed asbestos—not very flexible	20.0	61.0
Mahogany	Across grain	22.0	34.0
Insulex	Asbestos and plaster blocks—porous	22.0	29.0
Virginia pine	Across grain	23.0	34.0
Oak	Across grain	24.0	38.0
Hard maple	Across grain	27.0	44.0
Parafine	"Parowax" melting point 52°C	38.0	56.0
Gypsum plaster		54.0	...
Asbestos wood	Asbestos and cement—very hard and rigid	65.0	123.0

Sound Proof Insulation

Sound waves upon reaching any material are either reflected, transmitted through it or absorbed. That material forms the best sound proof insulation which while possessing the necessary durability, ease of application and other qualities will absorb most of the sound.

The principal material used for sound proof insulation on shipboard is hair felt and the following extracts from Navy Department Specifications for sound proof lagging illustrate an approved method of its application:

This shall consist of hair felt in four layers, each layer 1 inch thick and weighing not less than 14 ounces per square foot, fitted between furring pieces and held in place by steel sheathing, which shall be secured to wood furring pieces. For large vessels

Generated on 2024-09-12 11:25 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Table II

Material	Temperature Differences Deg. F.	B. T. U. per Sq. Ft. for 1" Thickness per Deg. F. Diff. in Temp. per 24 Hrs. Transmission	Conductivity	Approx. Wt. per Sq. Ft. per 1" Thickness in Pounds	Relative Combustibility	Authority for B. T. U.
Fire brick	500–1500	257.0	....	12.5	Non combustible	Average
Nonpareil insulating brick	500–1500	20.3	....	2.33(a)	Non combustible	Manufacturer
Diatomaceous earth and asbestos	100	....	10.8	1.66(a)	Non combustible	Manufacturer
	200	7.4	11.8			
Sponge felted asbestos	100	8.2	....	3.5(a)	Non combustible	Manufacturer
	200	8.6				
85% magnesia	100	8.4, 9.1	....	1.5, 1.4(a)	Non combustible	Two manufacturers
	200	9.0, 9.4				
Asbestos felt	100	11.0	....	2.3(a)	Non combustible	Manufacturer
	200	11.6				
Air cell asbestos	100	11.0	....	.96(a)	Non combustible	Manufacturer
	200	12.4				
Hair felt	...	6.0	....	.66(a)	Smoulders but will not spread fire(a)	Union Pacific R. R.
Pure corkboard	...	6.6(c)	....	.94(a)	Combustible slowly but will not spread fire	Union Pacific R. R. Mass. Inst. of Tech.
		6.4				
Waterproof lith(b)	...	7.4	....	1.53(a)	Partially comb. but will not spread fire(a)	Union Pacific R. R.
Pure cork lagging	...	8.6	....	1.25(a)	(Same as pure corkboard)	Manufacturer
Wool felt	...	8.7	....	1.75	Smoulders but will not spread fire	Manufacturer
Corkboard with binder	...	8.9	....	1.5	(Same as pure corkboard)	Mass. Inst. of Tech.
Mineral wool with binder	...	9.1	....	1.33	Non combustible	Mass. Inst. of Tech.
Balsa wood — medium wood, medium treatment	...	...	10.7	1.22(a)	Combustible	Bureau of Stds.

(a) Same authority as for the B. T. U.
(b) The corresponding figures for 2 inch thickness are 5.0 B. T. U. and 2.53 pounds.
(c) The corresponding figure for 2 inch thickness is 4.2 B. T. U.

Table III

Material	Thickness In Inches	B. T. U. per Sq. Ft. per Deg. F. Diff. in Temp. per 24 .Hrs. Transmission	Conductivity	Approx. Wt per Sq. Ft. in Pounds	Relative Combustibility	Authority for B. T. U.
Asbestos paper	1/16	...	192.0	.34	Non combustible	Bureau of Stds.
Asbestos rollboard	1/8	...	96.0	.70	Non combustible	Bureau of Stds.
Asbestos millboard	1/8	22.4	....	.74(a)	Non combustible	Union Pacific R. R.
	1/4	18.4	....	1.43(a)		
Cabot's quilt—3 ply	7/8	...	9.2	.36	Combustible but will not spread fire	Bureau of Stds.
Fireproof fibrofelt	1	9.0	....	.93(a)	Partially combustible but will not spread fire(a)	Union Pacific R. R.
Flaxlinum	3/4	7.4	....	1.07(a)	Smoulders but will not spread fire(a)	Union Pacific R. R.
Fireproof linofelt	3/4	7.3	....	1.17(a)	Smoulders but will not spread fire(a)	Union Pacific R. R.

(a) Same authority as for the B. T. U.

the sheathing shall be of 2½-pound plating except that for the floor shall be of 5-pound plating. For torpedoboat destroyers and other vessels of special light construction the sheathing shall be 17 mils thick except that for the floor shall be 2½-pound plating.

The spaces between the floor sheathing and the deck shall be filled with hair felt where the compartment is in the interior of the vessel or asbestos where the compartment has direct communication with a weather deck. The thickness of the floor insulation shall be suitably reduced where the deck height clear under beams (not taking account of the insulation) is less than 7 feet, with a minimum thickness of hair felt or asbestos of 1 inch.

For best results the lagging should cover as much as possible of all surfaces in the compartment which is to be soundproofed and should be fitted to full thickness over beams, stiffeners, etc.

A number of the vegetable fiber insulating materials previously dealt with have good sound insulating value and are advocated by their manufacturers for this purpose. Linofelt, Flaxlinum and Cabots Quilt are among them.

Mineral wool is used in some cases but the probability of its pulverizing, settling and leaving empty spaces is a decided objection to it.

The particular field of sound proof insulation on shipboard is the radio apparatus room. There are times when it is desirable to specially insulate some of the accommodations. Telephone booths and voice tube booths are sometimes insulated.

Electrical Insulation

The chief concern of the shipowner and shipbuilder apart from the wisdom of having this important insulation in line with the best practice is to see that it complies with the requirements of the National Board of Fire Underwriters and

Generated on 2024-09-12 11:23 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

the Rules and Regulations of the United States Steamboat Inspection Service, and, where a vessel is classed, with the requirements of the classification society concerned.

The United States Steamboat Inspection Service requires that—

Wires shall be run in approved iron conduits, armored casing or molding.

Iron conduit or armored casing shall be required in bunkers, cargo spaces, storerooms, etc., and in all places where the leads are liable to mechanical injury. Joints in wiring shall be avoided as far as possible in the above-named spaces. Where wires are led through beams, frames, or non-watertight bulkheads, they shall be carried either in iron conduits, armored casing or protected by hard rubber or other equivalent bushings.

Where wires are carried through watertight decks or bulkheads, they shall be provided with a suitable stuffing box at the deck or bulkhead. Where such points are liable to mechanical injury they shall be protected by suitable boxes or cages.

Joints shall be so spliced or the parts so joined as to be both mechanically and electrically secure without solder. They shall then be soldered and properly insulated and further protected by waterproof tape.

Also that the electrical installation including the wiring carried through wooden bulkheads, etc., shall be of such a nature as to preclude any danger from fire.

Rubber and porcelain are the two principal materials used for electrical insulation, the former to cover the conductors and the latter to insulate them from other materials to which they are attached or through which they pass. Hard rubber is also used for the last mentioned service.

Wiring which passes through bulkheads made of combustible material should be insulated from them by running them through tubes of porcelain, or other insulating material.

Insulation containing rubber is damaged by oil and particular attention has therefore to be given to the covering of electrical conductors on oil tankers. Particular attention should also be given to the insulation of wiring in locations where moisture is liable to collect. In both cases the wiring should preferably be lead covered.

Large Cranes for Shipyards and Harbor Service

Construction and Operation of 250-Ton Hammerhead and Floating Cranes Built in Germany for Fitting Out Large Ships

By E. Krahnen, M. E.*

In the so-called hammerhead cranes, the first of which was built by the Benrath Company (now Demag, Duisburg) a double cantilever is connected to a structural steel post which forms the central axis of a pyramidical frame work. The mechanism for lifting the load and for traversing the trolley are arranged entirely upon the trolley which travels on the front part of the cantilever, the tail end forming the balancing arm.

In later designs the lifting and traversing gears were usually arranged on the balancing arm, so as to minimize the weight of trolley and jib, the weight of the machinery acting as a counterweight. Also the form of the tower underwent a complete change. It now consists of a structural steel pyramidical column over which fits a frame-work to the head of which is fixed the cantilever.

The whole weight of the cantilever as well as the bell structure rests on the top of this central column and thus adds to the stability of the crane. The forces are transmitted to the column, the base of which is comparatively small. To reduce the friction to a minimum a combined roller and center bearing is placed on the top of the column while the lower extremity of the bell structure bears against a pressure ring.

Provisions are made to facilitate the inspection of the top bearing. By means of four hydraulic jacks the entire superstructure of the crane including the bell structure can be lifted without any preparations whatsoever and of a sufficient height to free the rollers and allow of removing any part of the bearing.

Auxiliary Slewing Jib

While the size and lifting capacity of these cranes could be increased in later designs it was not possible to increase the slewing speed of the jib on account of the enormous masses that had to be accelerated. This made these cranes rather unwieldly for handling smaller loads, up to about 20 tons, which form the bulk of the material to be lifted while the maximum loads have to be lifted only occasionally. To facilitate the handling of lighter loads, the Demag, Duisburg, introduced an auxiliary slewing jib crane of about 20 tons capacity that travels on a track laid on the upper flanges along the entire length of the cantilever. The main crab travels on a runway that is placed between the main girders. The jib crane is able to cover a fairly large area on both sides of the crane and permits of masts higher than the crane itself being placed in position.

An objection to the ordinary type of hammerhead crane is that the cantilever arm in rotating may foul the masts of vessels which are being fitted out. This has been overcome by fitting a derricking motion to the jib, Fig. 2, making the crane independent of the height of the deck superstructures because when the jib is derricked the crane revolves clear. As the crane shown in Fig. 1, built for the Blohm & Voss shipyard, Hamburg, embodies all these features a short description of it will be given.

Blohm & Voss 250-Ton Crane

In the design of this crane great care was taken to reduce the deadweight to the utmost so that the crane could be worked with the least power possible. Owing to the great many ways the load may be applied in addition to the numerous motions that had to be performed the calculations were of a most elaborate nature. The whole crane, and especially the jib was built to offer the least possible resistance to wind pressure.

The crane is capable of lifting a load of 250 tons at a radius of 113 feet; 200 tons at 130 feet; and 100 tons at 175 feet. The electric locomotive crane, that travels a distance of 300 feet on the top of the cantilever, is able to lift 20 tons at a radius of 33 feet, and 10 tons at 60 feet so that the total radius for a 10-ton load is not less than 240 feet.

Control

The whole machinery with exception of the slewing gear is arranged in a house placed in the tail end of the cantilever. Two Ward Leonard motor generating sets of 95 horsepower are provided. With this system of control the whole of the regulation is effected by varying the excitation of the generators, the motors being permanently excited. As the

*With Demag, Duisburg, Germany.

Generated on 2024-09-12 11:47 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

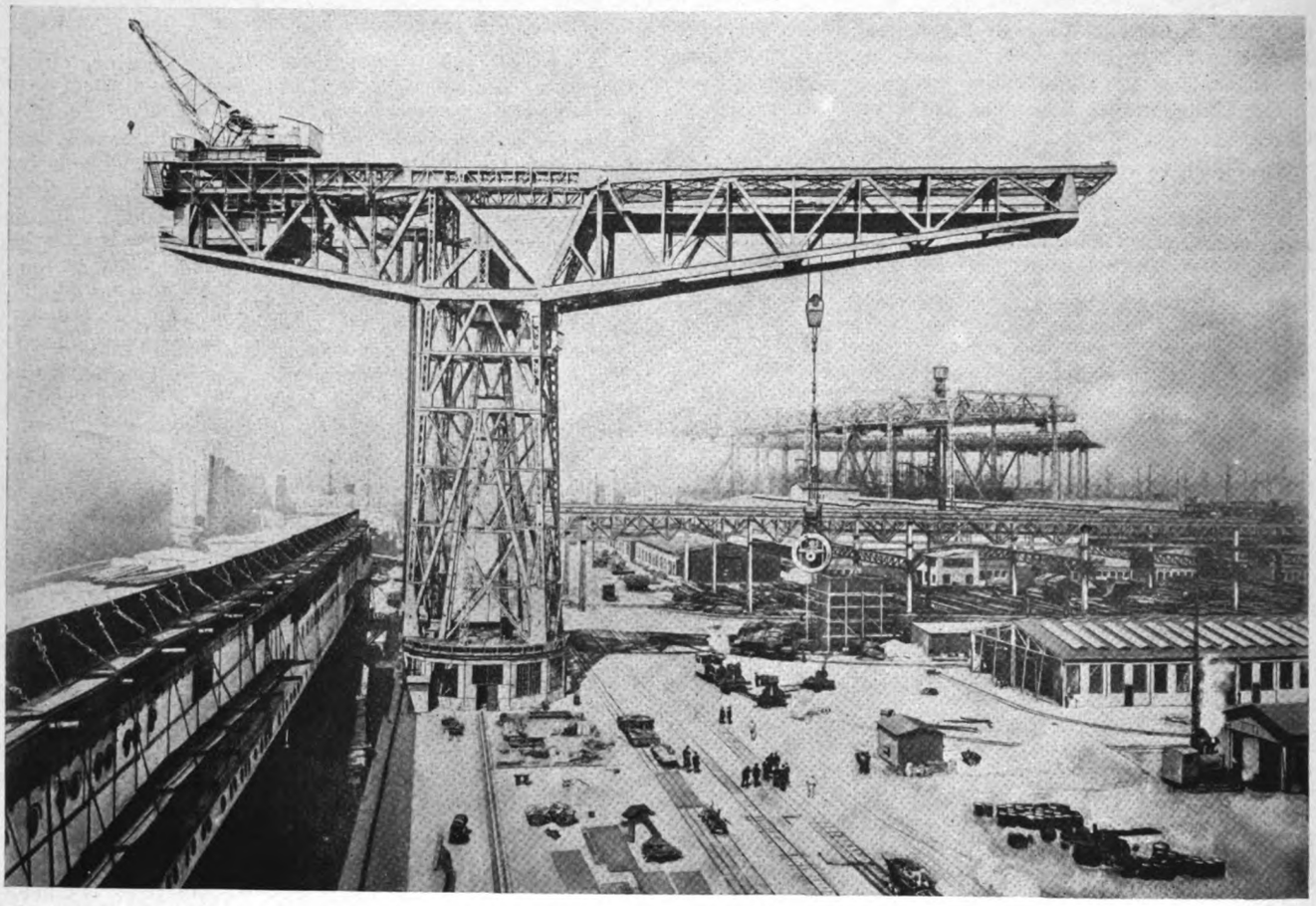


Fig. 1.—250-Ton Hammerhead Crane at Blohm and Voss Shipyard, Hamburg, Germany

circuit for exciting the field amounts to only 3 percent of the main circuit, very small controllers are required.

The position of the controller handle exactly corresponds to a given speed of the motors. As it can be easily moved through a fairly large angle, a most accurate graduation of speeds is obtained so that the slightest movements can be made with ease and exactness, particularly when fitting machines or engine parts.

For ordinary working purposes one set is used for lifting, the other for luffing. Provisions are made that both motors can be switched to one set so that the work may be continued in case one set should get out of order.

Hoisting Mechanism

The hoisting motors drive two friction drums round which the hoisting rope is wound as well as the luffing gear. The slack end of the rope is taken up by a compensating block moving vertically on the rear of the bell structure. By the use of a change-speed gear smaller loads can be lifted at a greater speed. Two brakes are fitted, one electro mechanical brake the other a mechanical brake which is worked by the operator and which might serve as an emergency brake.

The lifting speeds are 5.25 feet per minute for the full load of 250 tons; 6.5 feet for loads below 200 tons; and as much as 13 feet for loads below 100 tons. The lowering speeds are 50 percent higher.

For luffing the jib a pinion on the motor shaft is thrown in gear which drives through bevel and spur gear reductions two large horizontal spindles situated on the top of the cantilever. These spindles traverse a nut carriage that is connected to the top flanges of the main jib by means of connecting rods. The luffing gear is designed so that the jib can be raised in 30 minutes with no load, and within 40 to 50 minutes with a load of 110 tons.

To avoid overloading of the crane structure the controlling devices of the main trolley and the locomotive crane are electrically blocked so that only one crane can work at a time. The main trolley can thus be only operated while the jib crane is standing in its extreme position on the tail-end of the cantilever where it acts as additional counterweight.

One Man Operates Entire Crane

Only one man is required to operate the whole crane. From his cabin below the fulcrum of the jib he is able to observe the work. Indicating devices, that are placed in the cabin, show him the exact position of the load even if the load is out of sight.

The locomotive crane is a self-contained crane with its own controlling devices and a separate controller for operating the slewing gear of the main jib.

Cranes of these dimensions have a large working area which can be doubled by placing them on a pier so that ships on both sides of the pier can be fitted out. The working area, though considerably increased over that of the old type cranes, can naturally be only a limited one. An almost unlimited area can only be covered by using a floating crane as it can be moved along the ship wherever required, obviating the necessity of moving the vessel at its moorings.

Floating Cranes

Floating cranes were first built as shears placed on a pontoon. A new type was introduced by the Demag, Duisburg, who built this crane for Swan, Hunter & Wigham Richardson's shipyard. To increase the reach a bent jib was employed which allowed the crane to lie close to the ship. With the increasing size of ships, the jib had to be mounted on a pedestal or tower of sufficient height to enable the jib to clear the deck superstructures. A crane of this type was first built for the Russian government for its Baltic shipyard, and has been subsequently furnished

Generated on 2024-09-12 11:25 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

to the Société Anonyme des Forges et Chantiers de la Méditerrane la Seyne, Toulon, France, to the Thames Iron Works, London, to Wilton's Engineering Works Shipyards, Rotterdam, and to the Russian Shipbuilding Company of Nikolajeff. They were built for putting on board ship complete boilers, turbines, pivots for gun turrets and for armoring battleships and have given much satisfaction. The crane represented in Fig. 3 has a capacity of 200 tons. The pontoon is built of steel and angles and is about 100 feet long and 78 feet wide. It is divided into a number of watertight compartments by longitudinal and transverse bulkheads. The stability of the crane is maintained even if two adjacent compartments become filled with water.

On this pontoon is built a steel frame work tower about 36 feet high. The jib which is provided with a derricking motion is built on the top platform of this tower. It derricks round the front portion of its base on two trunnions. The rear legs of the jib are secured by connecting rods fixed to a travelling nut carriage which travels vertically against the rear face of the tower. This carriage is traversed by two large vertical screws which are made to revolve together, for actuating the crosshead by a 110 horsepower steam engine, placed on deck. The angle formed by the front face of the jib and the extension of the platform can be varied from 30 to 85 degrees, a range which corresponds to a travel of the jib head of about 35 feet. Two sets of 100-ton tackle blocks are provided and also a 5-ton runner and a 20-ton block fixed to the end of the jib.

For lifting a 200-ton load, an equalizer is placed between the two 100-ton hooks. The main hook is arranged to float on a ball bearing facilitating the revolving of the load if required. The hauling ropes are wound round two drums fitted on deck and driven simultaneously or separately at

Fig. 2.—250-Ton Hammerhead Crane With Raised Jib

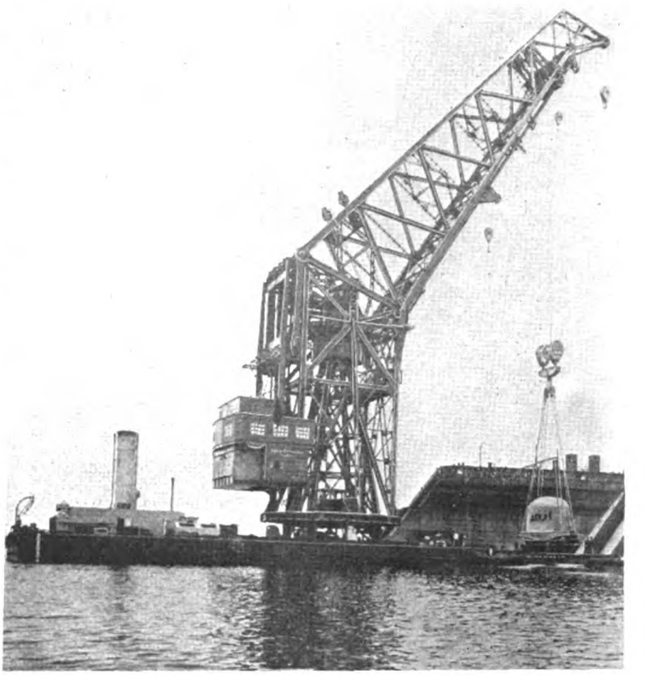


Fig. 3.—Floating Crane Handling 312-Ton Test Load

will by a 110 horsepower engine similar to the one for extending and pulling up the jib.

The 5-ton runner which travels along the front beams of the jib can be made to occupy any position along the jib.

The pontoon is provided with a compartment for taking water ballast with the object of limiting the inclination of the crane when heavy loads have to be lifted. Two steam winches are used for towing purposes.

A still later floating crane developed by the Demag is electrically operated, the jib being mounted on a bell shaped structure capable of revolving through 360 degrees on a tall pyramidical steel tower.

The full working load of 250 tons can be lifted to a height of 180 feet above the water level with an outreach beyond the pontoon fender of not less than 60 feet. With any load up to 50 tons the height of lift is 150 feet at an outreach of 138 feet, beyond the pontoon. Dealing with normal lifts, excepting turbines and boilers, this crane may lie on the offside of the ship, lift a load from the wharf, the jib reaching over the ship, and deposit it in the ship at any point desired.

For lifting there are two 95 horsepower motors with series parallel control. These motors are utilized for rotating the two large screws used in luffing the jib. As the luffing and hoisting gear may be coupled together, it is possible to move the load approximately horizontal while derricking.

The electric current for these motors is generated by two turbo-generators on board the pontoon so that the crane can be used at any point in the yard and is independent of a land electric station. Only one man is required to operate the crane.

In this crane there are no movable counterweights, nor is water ballast employed. The necessary stability with all loads and all positions of the jib depends wholly on the dimensions of the pontoon. This allows the operator to fix his attention entirely on the handling of the load, eliminating the possibility of capsizing through neglecting to tend to movable counterweights.

The pontoon is propelled by twin screws driven by steam engines each of 500 horsepower. A small electric lighting plant is installed on board which makes working at night possible by the aid of powerful searchlights.

Generated on 2024-09-12 11:23 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Generated on 2024-09-12 11:28 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

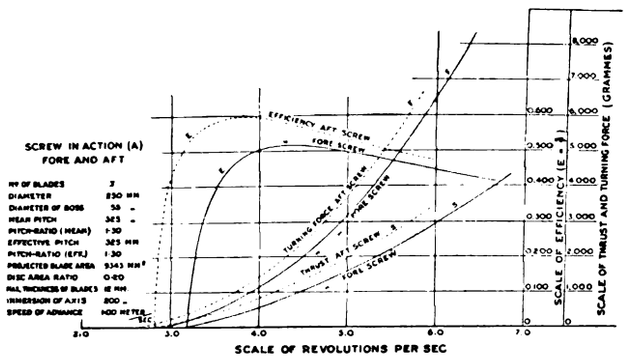

SCREW IN ACTION (A)
FORE AND AFT
SCALE OF REVOLUTIONS PER SEC
SCALE OF THRUST AND TURNING FORCE (GRAMMES)
SCALE OF EFFICIENCY (E = η)

FIG. 1.—CURVES OF THRUST, TURNING-FORCE AND EFFICIENCY.
Co-axial, Contrary-turning { Fore Screw (A). / Aft Screw (A).

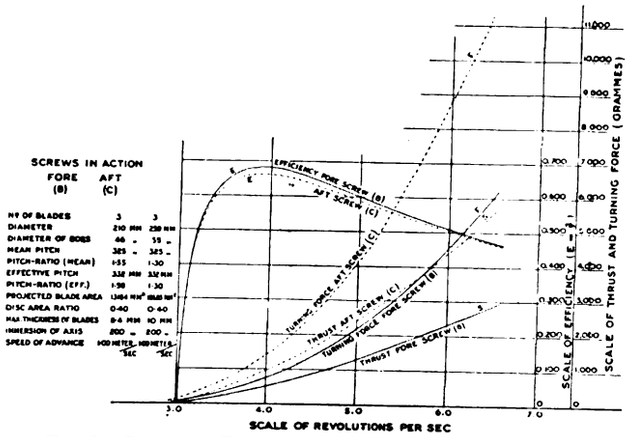

SCREWS IN ACTION
FORE (B) AFT (C)
SCALE OF REVOLUTIONS PER SEC
SCALE OF THRUST AND TURNING FORCE (GRAMMES)
SCALE OF EFFICIENCY (E = η)

FIG. 3.—CURVES OF THRUST, TURNING-FORCE AND EFFICIENCY.
Co-axial { Fore Screw (B) / Aft Screw (C) } Contrary-turning.

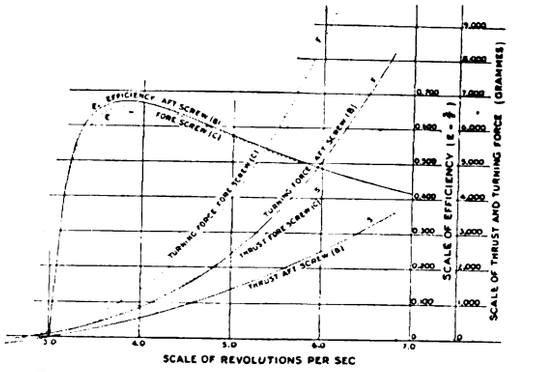


FIG. 5.—CURVES OF THRUST, TURNING-FORCE AND EFFICIENCY.
Co-axial { Fore Screw (C) / Aft Screw (B) } Contrary-turning.

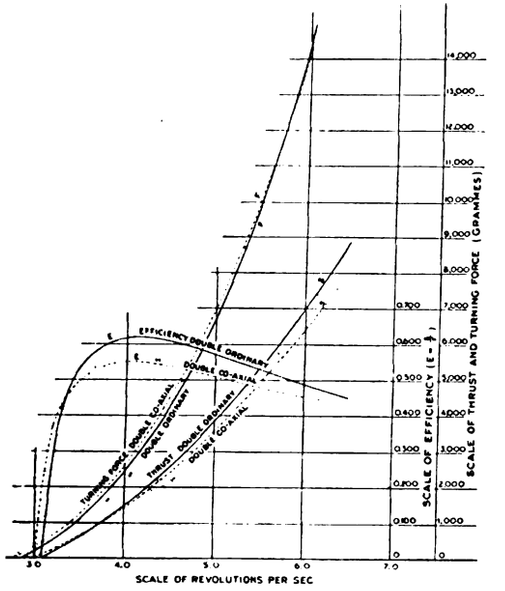


FIG. 2.—CURVES OF THRUST, TURNING-FORCE AND EFFICIENCY.
Double Ordinary Screw (A).
Double Contrary-turning Co-axial (A).

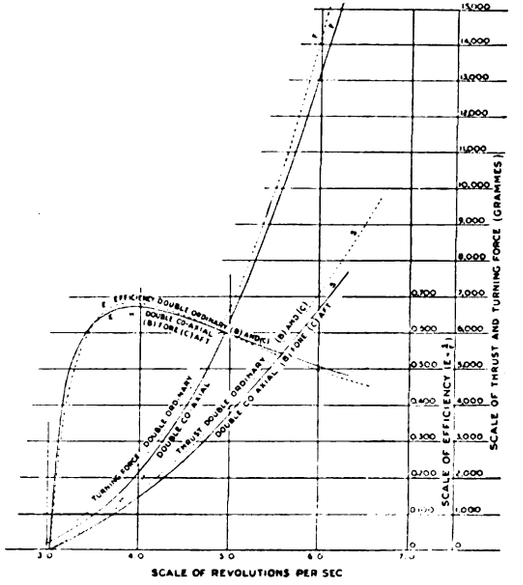


FIG. 4.—CURVES OF THRUST, TURNING-FORCE AND EFFICIENCY.
Hypothetical Double Ordinary (B) and (C), Double Co-axial Screws (B) Fore and (C) Aft, Contrary-turning.

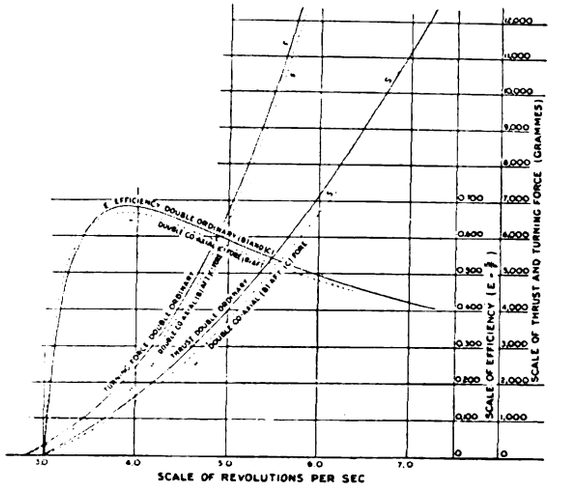


FIG. 6.—CURVES OF THRUST, TURNING-FORCE AND EFFICIENCY.
Hypothetical Double Ordinary (B) and (C).
Double Co-axial Contrary-turning { (C) Fore. / (B) Aft.

Original from UNIVERSITY OF MICHIGAN

Further Experiments on Contrary-Turning Co-Axial Screw Propellers*

By General G. Rota†

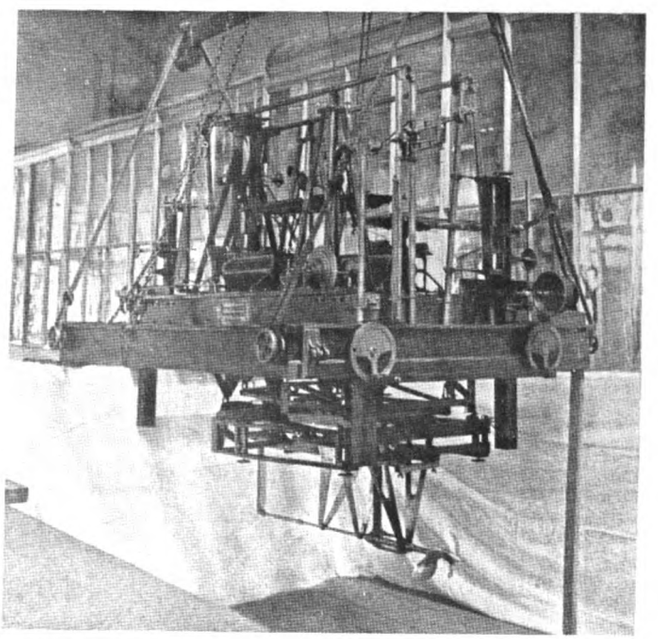
SHIP propulsion by means of double co-axial contrary-turning screw propellers has long been a matter of research. More than once results of experimental work have been presented before this Institution, and have given rise to interesting discussions.

In 1909 I had the honor of submitting the results of some experiments made in the Royal Dockyard of Castellamare di Stabia on a steam launch, whose single propeller had been replaced by two co-axial contrary-turning screw propellers. The same steam engine which drove the single propeller was employed to drive by gears the double propellers. The experiments showed that practically the same speed was obtained in both systems, with the same indicated horsepower, so that the work lost in the gear transmission was evidently regained through a better efficiency in the propellers. I rated this gain to be about 20 percent but whatever be the real amount of this figure, one thing came out as stated, viz. that the total efficiency of double contrary-turning screw propellers was higher than that obtained by a single propeller. Still better results could be obtained, as compared with ordinary twin screws, if the gain due to the lesser resistance of the hull, and to the absence of brackets, shafts and bossings, had been taken into consideration.

Mr. Luke, in his interesting paper presented to this Institution in 1914,†† brought a valuable contribution to this question, pointing out the value of hull efficiency elements under various conditions, viz. with a single screw, with twin screw propellers on parallel axes, with double contrary-turning co-axial screw propellers (combination), with double co-axial similar-turning screw propellers (tandem), etc. Considering the arrangement of propellers in which I am now interested, viz. with contrary-turning co-axial propellers, the particulars of Mr. Luke's experiences pointed to the conclusion that if a real gain in hull efficiency was obtained in full-bodied ships, but less in fine-formed ships, on the other hand, the propulsive efficiency proper for the screw was far less than that obtained with the single screw or ordinary twin screws, in the ratio of about 86 percent; so that there was practically the same total propulsive efficiency with fine-formed ships, and superior only by 7 percent with the co-axial contrary-turning screw propellers associated with full-bodied ships as compared with the single screw. These results did not agree with the results I obtained from my first experiments, and this induced me to undertake new experimental researches into this question.

In my first experiments with screw models, which I reported briefly in a written discussion on Mr. Luke's paper above mentioned (and I am inclined to think in those also of Mr. Luke and of other experimenters), the propulsive figures of each of the two contrary-turning co-axial screw propellers were not measured separately, so that it was always the value of the thrust given by the two screws and the total value of the efficiency of both which were obtained.

Wishing to know exactly what are in every case the peculiarities of the efficiency of each of the two screws acting together while contrary-turning, we have succeeded in the Experimental Tank at Spezia in modifying the general arrangement of the apparatus for the experiments with model screws, so that we can now measure the thrust and turning force of each screw either separately or in combination. It is not possible here to give a description of that apparatus, but it is shown in the photograph.



Apparatus Used at Spezia Tank for Testing Model Contrary-Turning Co-Axial Screw Propellers

The analysis of the performances of each screw enables us to investigate the influence of diameter, pitch-ratio, disk-area ratio and revolutions of the same, with the object of obtaining a higher efficiency, because, as is well known, this can only be attained by experiment.

In this paper, therefore, I give the results of some researches made with that apparatus with the sole object of adding a small contribution towards the solution of model experiment problems.

*Paper read at the Paris summer meetings of the sixty-third session of the Institution of Naval Architects, July 6, 1922.

†Royal Italian Navy.

††"Further Experiments Upon Wake and Thrust Deduction," Transactions of Institution of Naval Architects. Volume XLI, page 33.

"BEHIND" EXPERIMENTS (I.E. SCREW REVOLVING BEHIND THE MODEL)

	Full Model				Fine Model			
Screws in Action	Propeller Efficiency, E	Wake, $\frac{v - v_1}{v_1}$	Thrust Deduction $1 - \frac{R}{S}$	Hull Efficiency, $e = \frac{v}{v_1}\cdot\frac{R}{S}$	Propulsive Efficiency, E . e	Wake	Thrust Deduction	Hull Efficiency	Propulsive Efficiency
Single	0.56	0.34	0.17	1.11	0.62	0.22	0.16	1.02	0.57
Double ordinary	0.56	0.20	0.15	1.02	0.57	0.13	0.13	0.98	0.55
Double contrary-turning co-axial	0.49	0.61	0.17	1.34	0.66	0.33	0.12	1.17	0.57

Generated on 2024-09-12 11:23 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Several sets of experiments were carried out with this apparatus, adopting different kinds of screws, and I shall describe the principal features of some of them. Symmetrical screws (type A) of 250 millimeters diameter, 325 millimeters pitch, and a disk-area ratio of 20 percent, have given results which almost agree with those given by Mr. Luke.

In Fig. 1 are given the thrust, turning-force and efficiency curves as obtained with these co-axial screws. The difference between the two efficiency curves is considerable. The one corresponding to the fore propeller is much below the efficiency curve of the after propeller.

In Fig. 2 are given the thrust, turning-force and efficiency curves resulting from experiments with the same propellers (A) fitted on parallel shafts as in the ordinary twin-screw arrangement; the same are compared with the thrust turning-force and efficiency curves relating to contrary-turning screws on a common axis; the thrust and turning-force being the sum of the same relating to the individual propeller, and the efficiency is the total efficiency of the propelling system. From this comparison it appears that co-axial screw propeller efficiency for the model A is inferior to that of the single screw or the twin screws of same shape acting on parallel axes to an extent which agrees sufficiently with Mr. Luke's deductions; the efficiency of the double co-axial, for the case considered, being about 88 percent as compared with the same value for the ordinary twin-screw arrangement. With other combinations of screw propellers, however, the results were very different, so that it is possible not only to have a higher value of the ratio mentioned above, but also to have practically equal efficiency.

Further experiments were made with other screw propeller arrangements to investigate the influence of a less diameter for the fore propeller than for the after one and vice versa, keeping a constant pitch and increasing the disk-area ratio as compared with the experiments previously mentioned. In a first combination (see Figs. 3 and 4), the fore propeller (B) had

diameter = 210 millimeters
pitch = 325 millimeters
disk-area ratio = 0.40

and the aft propeller (C) had

diameter = 250 millimeters
pitch = 325 millimeters
disk-area ratio = 0.40

In a second combination the propellers were interchanged (see Figs. 5 and 6). The results were very interesting; the total efficiency of the co-axial screw propellers was practically the same in both combinations, and may also be considered to be the same as with equal open single or double ordinary screw propellers.

Total Propulsive Efficiency Increased

In view of the previous considerations, a good screw propeller efficiency can be obtained either with the two co-axial contrary-turning screws or with the single or with ordinary twin screws; so that the total propulsive efficiency, which, as is well known, is the product of screw propeller efficiency multiplied by hull efficiency, for the double contrary-turning screw propellers will have all the beneficial influence of the high hull efficiency of the same combination compared with the corresponding figure for single and ordinary twin-screw arrangements, as was stated in the interesting communication made by Mr. Luke.

Mr. Luke's investigations showed in fact that with the double contrary-turning screw propellers on a common axis the hull efficiency was 1.34 to 1.17, according to the fineness of the hull, instead of 1.02 to 0.98 as in ordinary twin-screw arrangements, and in the same ratio in the whole will remain at least the corresponding value of total propulsive efficiency. I am inclined to think that by the use of double contrary-turning screw propellers, and with the arrangements which experience may suggest, one will obtain a great improvement in the total propulsive efficiency—not less than 20 percent—even without taking into account the gain which may easily be foreseen by reason of the reduced resistance of the hull itself as a consequence of the suppression of brackets, bossings, etc.

Other special devices to increase the ship propulsion efficiency are already in use: the well-known fixed guide-blades used in Sir John Thornycroft's screw turbine propellers were shaped with a contrary curvature, as compared with revolving screw blades, so as to direct the water into a straight line aft and thus utilize the rotational component of the wake. Herr Wagner's counter-propeller is a similar contrivance designed to direct in a straight line aft the helicoidal motion of the wake. These experiments, and also the applications made with those devices, have shown, in various degrees, the possibility of increasing a ship's propulsive efficiency, but I am not aware of any advantage having been gained by adopting any of the above devices in order to improve the total efficiency, viz. screw efficiency and hull efficiency.

The double contrary-turning co-axial screw propellers would give, in my opinion, still better results, considering the contribution offered to the whole thrust by fixed guideblades or a fixed counter-propeller in a second propeller.

The arrangement of double co-axial contrary-turning screw propellers should therefore be considered with great attention by designers in cases where the difficulties connected with the arrangement of two co-axial shafts do not appear impossible of solution. Such a case is that of cargo boats with very full hulls when the propelling machinery is far aft. There is also a possibility of utilizing this system in submarines.

Machinery Arrangements

It is not possible here to enter into details of the alternative machinery arrangements in mercantile cargo boats, i.e. whether steam turbines should be utilized to drive both shafts, or a combination arrangement with a reciprocating steam-engine on the inner shaft and a steam turbine on the outer shaft, or whether electric motors should be provided on both shafts.

Other arrangements could be devised with steam turbines and reduction gears.

The double contrary-turning co-axial screw propellers would be, perhaps, suitable in submersible craft with the object of obtaining the simultaneous motion of both motors, electric and Diesel, for eventually increasing the speed on the surface. The advantages should be considerable; for example, a submersible with electric motors able to give a speed of 9 knots submerged and with Diesel motors, 12 knots surface speed. If it were possible to have all the motors acting at the same time, by adopting the co-axial contrary-turning screw propeller system, the surface speed could probably be increased to 15 knots, and perhaps a little more.

Under ordinary circumstances only one screw is in action, the other revolves idle, and so increases the resistance as to require a higher thrust; but considering all aspects of the problem, it should be possible to ensure conditions such as to reduce and perhaps overcome the above difficulty.

Before concluding I desire to express my gratitude to Captain A. Farina, of the Royal Italian Naval Construction Corps, for his valuable assistance in conducting the experimental work in the Tank at Spezia, where he is now in charge.

Export Markets for Marine Engine.—An analysis of foreign markets by the Acting Chief of the Automotive Division, Department of Commerce, shows that Latin America offers excellent prospects for the sale of American motor boats and marine engines, while in the Far East a most remunerative market for motors can be developed.

Generated on 2024-09-12 11:24 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Questions and Answers Relating to Naval Architecture and Marine Engineering

Conducted by James L. Bates, Naval Architect, and W. B. Newton, Marine Engineer

This department is maintained for the purpose of answering all questions relating to ships and their machinery. All inquiries should bear the name and address of the writer. Anonymous communications will not be considered. The identity of the writer, however, will not be disclosed unless the editor is given permission to do so.

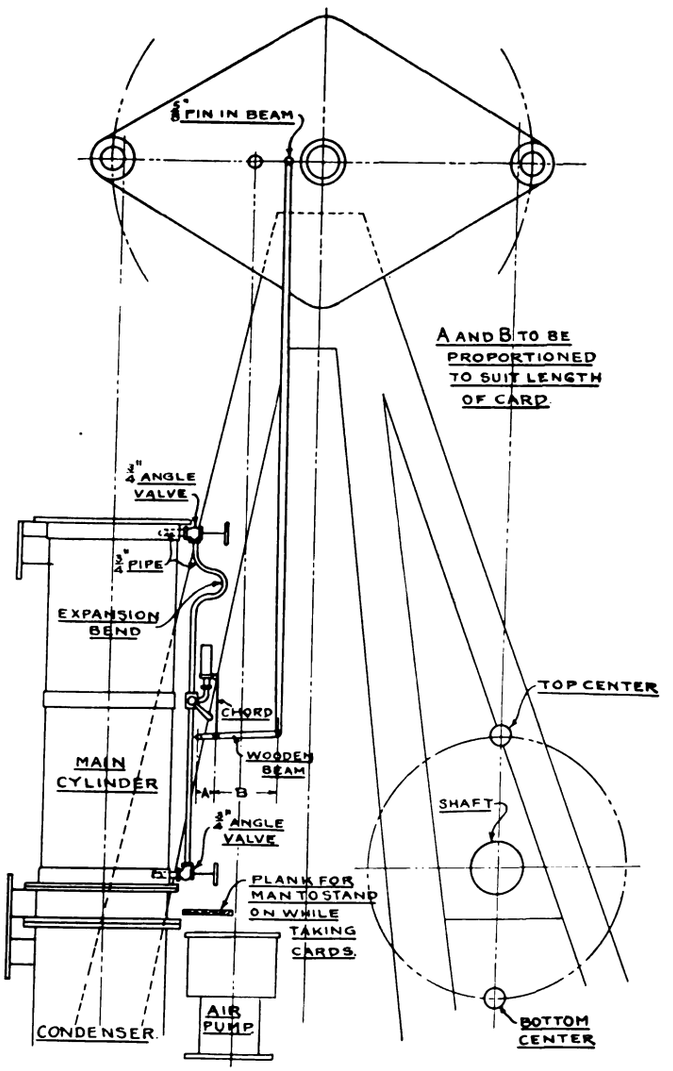
Indicator Cards from a Beam Engine

Q. (1164).—Please advise me how to connect a steam indicator to a beam engine for taking set of cards from same. The engine is on an inside wheel double end ferry steamer and has a cylinder 58 inches diameter and 10-foot stroke, the steam pressure allowed on the boiler is 50 pounds per square inch.

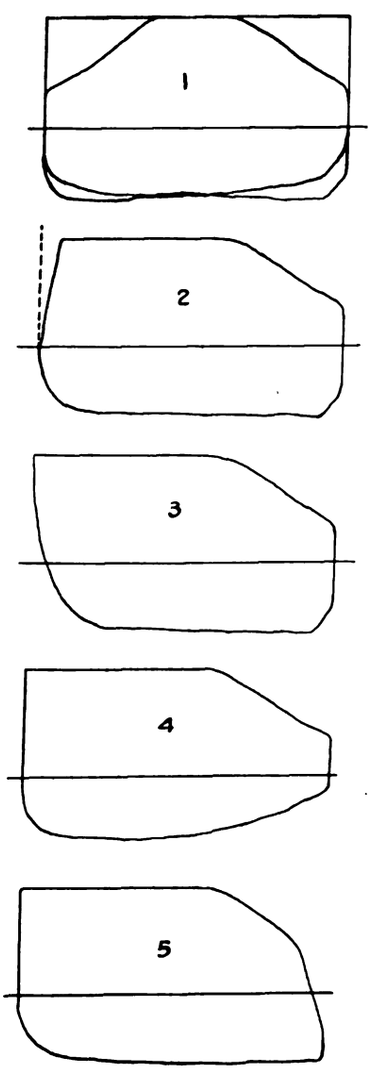
There are no connections on the cylinder, or any other part of engine, for connecting the indicator or cord of same. I can put the cocks in the cylinder, but I want to know where to connect the cord to the engine.

Please sketch set of cards, as they should look, taken from this engine, also sketch sets with too early and too late steam admissions and exhaust opening.

A. (1164).—If, as you say, there are no connections on the cylinder, it will be necessary before rigging up to indicate to have the upper and lower parts of the cylinder bored and tapped to take the usual piping for the indicator. These tappings should be drilled so that they open into the clearance between the top of the piston and under side of cylinder cover when the crank is on bottom center and the under side of piston and bottom of cylinder when the crank is on top center. This piping should be not less than ¾ inch and should have a valve top and bottom with the usual three-way cock to take the indicator, at some convenient place, preferably about halfway between the upper and lower connections.



Method of Taking Indicator Cards from Beam Engine



Sample Cards Taken from Beam Engine

Generated on 2024-09-12 11:23 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

In the upper part of this piping a bend should be made to take care of the expansion.

The reducing gear can be of any pattern. In a number of cases the writer has used a reducing gear along the following lines: A small pin about ⅝ inch diameter is located in the beam as near as possible to the beam center to suit conditions and from this pin a light link is run down to a small beam which can have its center fastened to any convenient stationary part of the engine. The engine frame is generally the best place for this purpose. This beam and link can be made of wood (ash will do) as wood is light and inexpensive. It will be necessary to arrange the leverage of the beam to get the required length of card.

Acknowledgment is herewith made to the W. & A. Fletcher Company, Hoboken, N. J., for the above reply to your question with its accompanying sketch.

Referring to the cards shown:

1. Valves properly set.
2. Late admission.
3. Early admission.
4. Late exhaust.
5. Early exhaust.

Comparison of Boilers

Q. (1166).—Will you please let me have some information regarding the efficiency, power developed, cost of installation and durability of Scotch marine, straight tube, bent tube, watertube and externally fired return tubular boilers such as are used in stationary plants, assuming similar conditions as nearly as possible in each case. Also similar information for coal and oil fuel.—F. V. G.

A. (1166).—From a careful reading of your question it would appear that a discussion in considerable detail of the power, cost of installation, durability, etc., of the several forms of Scotch boiler in comparison with the watertube and all other recognized forms of boiler would be necessary in order to properly answer your question. You will readily appreciate the fact that any such exhaustive handling of the subject is entirely without the province of this Department. It is believed that information, such as you desire, can only be obtained by a thorough study of boiler design and operation in each of the fields in which the several types referred to are in use. Even after such a study has been made, it is considered doubtful whether the comparison "assuming similar conditions as nearly as possible" would be practicable as each type is presumably fitted for operation under certain conditions and would be at disadvantage, if otherwise operated.

LETTERS TO THE EDITOR

Effective Simplification Must Consider Operator's Standpoint

I have read with interest the article by Mr. N. C. Wiley in the August issue of MARINE ENGINEERING AND SHIPPING AGE, "Simplification—Has it a Place in Shipbuilding?"

It is, of course, agreed that simplification with resultant saving in time and money to both owner and shipbuilder is desirable, if, by so doing, a satisfactory job is obtained from the owner's or operator's standpoint. Mr. Wiley's article treats the subject entirely from the shipbuilder's or contractor's standpoint and fails to appreciate the subject from the operator's point of view.

The author's criticism of operators who maintain a technical staff to prepare plans and specifications giving a detailed description of the work, as well as to check the plans and certain important details of construction, is not justified. The specifications must be complete and definite, if the shipbuilder is to estimate intelligently the cost of the work. The operator is in an excellent position to know what has proven to be the most satisfactory under service conditions, and there is an increasing tendency among ship operators to have and maintain an adequate and efficient technical staff to collect data and incorporate the results in preparing specifications for new work. It is only persistent and careful attention to details of construction and operation that enables the operator successfully to meet competition. It is axiomatic that the time required to prepare complete specifications which will insure the proper performance by the shipyard of the work intended is very fruitful to both the operator and the shipbuilder. In practice, it has been found absolutely necessary to have complete specifications in order to secure a satisfactory job in accordance with the true intent of the specifications.

With reference to Mr. Wiley's statement that "The expense and folly of submitting detail plans for approval are not fully realized by the average operator," it is generally conceded that the quickest, best and most economical way in the long run is to work from plans which have been approved by the operator. Rarely, if ever, have the operators insisted on or attempted to "criticize and check the plans of every detail of construction * * *." The inference in the article to leave it to the yard does not work out well in practice.

The reference to the specifications on a "rush job" which required flanged copper pipe for steam heating system obviously refers to the recent reconditioning of the *President Polk* (ex-*Granite State*) at the Bethlehem Shipbuilding Corporation's Baltimore Dry Dock plant, is ill-advised. In this case, it should be remembered that much of this piping is run behind stateroom or public room sheathing or ceiling and that screwed pipe connections are not the best practice for this condition. The operator must constantly look ahead and avoid and reduce, wherever possible, maintainance and repair costs. Navy practice, even where pipes are exposed, advocates flanged copper pipe for all steam lines. Its many advantages are too well known to repeat here. The only disadvantage is its greater initial cost, but this is offset by the freedom from leaky joints and connections, the avoidance of which is so essential in the passenger ship services. Practically every big reconditioning job on passenger ships of recent date has specified flanged copper piping for steam heating systems; it may also be considered the standard practice of the International Mercantile Marine, United States Lines and other large passenger ship companies.

How can simpler specifications and less checking of detail plans result in increased effectiveness and decreased cost of inspection as noted in the article's summary? It must of necessity be just the contrary.

In treating a subject of this kind it is of prime importance to consider it also from the owner's or operator's viewpoint, for what is satisfactory to the operator will be satisfactory to the shipbuilders in the long run because without successful operation there will be little, if any, commercial building or extensive reconditioning in this country.

New York City. A. M. YOUNGQUIST.

Operators Should Pool Their Experience

Mr. Youngquist's statement that I treated the subject of simplification entirely from the builder's point of view is disappointing, as I had attempted not to, and had instanced several advantages to operators in addition to decreased first cost. In spite of "the excellent position" operators are in, they seldom agree in their requirements. Take at random the specifications of several companies in similar trades, and line up their requirements on rigging, piping, rail stanchions, etc. The writer has done this, much to his confusion. He has also seen prints of standard fittings which had already received signed approval from several operators returned

Generated on 2024-09-12 11:24 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

from other operators with a fillet increased here, a pin there, and so on. Standard plans or practices are not retained by builders which are usually rejected when proposed. Therefore, builders' standards, if brought together and fairly analyzed, would represent a broader "experience under service conditions" than any one operator possesses. That is what I suggested should be done. I also suggested that operators, with Mr. Hoover's aid, pool their experience and iron out their disagreements and contradictions, then let the builders know, for once and all, what they decide is wanted.

To propably 95 percent of the readers of MARINE ENGINEERING AND SHIPPING AGE, it was not obvious what ship I meant in my illustration on piping. The statement as to where the copper pipe is run on the *President Polk* should be amplified by adding the words "in third-class quarters," as that ship still has screwed pipe behind sheathing and ceiling in first-class quarters. Later and larger American passenger ships have screwed steam heat piping throughout. However, I did not condemn the change on its merits and specifically stated so. I am merely wondering which kind of pipe the next passenger ship I work on will have, and there is nothing to guide my guess.

Mr. Youngquist, in his last paragraph, appears to assign our shipbuilding difficulties to unsatisfactory quality rather than to excessive cost. It will be a new viewpoint to many, and one seldom appearing in the press.

Baltimore, Md. N. C. WILEY.

NEW BOOKS

STEAM TURBINES (Second edition, 1922). By William J. Goudie. Size, 6 by 9 inches. Illustrations, 329. Longmans, Green and Company, New York.

The second edition of this work, although carried out on the general scheme of the first edition, has been practically rewritten. On account of the rapid development of the geared marine turbine and the necessity of describing recent designs by the leading manufacturers, the work has been considerably enlarged.

The author appears to have had the viewpoint of students, designers and operators well in mind in compiling his book. The principles and methods of arriving at basic formulæ are clearly explained and illustrated by examples showing the methods of calculation. Although these calculations in many cases require the exercise of judgment in the selection of empirical coefficients, nevertheless the text is designed to be applied to given cases under arbitrarily assumed conditions.

Many of the designers and draftsmen, however, will take the principles and formulæ for granted or will decide from their own experience, having worked out a few of the formulæ, that the work is sound. They will, of course, modify some of the empirical coefficients to suit what their past experience has taught them and no doubt many of them will resolve to check the scaffolding upon which the text is built at their earliest opportunity.

The first portion of the text is devoted to detailed descriptions of the various turbines now on the market and this portion of the book should appeal to seagoing engineers and managers and foremen responsible for the erection of such machinery. They can easily get a good idea of the intricacies of the various designs from the sectional drawings which are profusely given.

From these drawings not only the inner working parts and their relation to each other can be discerned but also their relation to the complete installation. This is just what a number of the readers will want to know, and the book gives them a clear exposition of how the various turbines work, together with the whys and wherefores.

Much of the volume is strictly technical but there is considerable descriptive matter that can be read with comparative ease and, therefore, the volume should be a valuable addition to the library of both technical and practical men.

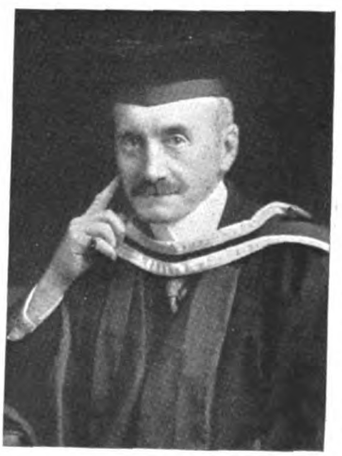
It should be noted that the work deals with the turbine proper only. As the author states, space is not available to take up the condensing plant or auxiliary machinery. Any matters relating to turbines, however, can be easily and quickly found by the aid of the comprehensive index.

PERSONAL MENTION

L. A. W. DOHERTY, general traffic manager of the Canada Steamship Lines of Montreal, has been made freight traffic manager of this company.

EDWARD P. FARLEY, of Chicago, vice-president in charge of sales of the Emergency Fleet Corporation, has resigned in order to return to private business.

DR. BRYSSON CUNNINGHAM, D.Sc., B.E., F.R.S.E., M. Inst. C. E., editor of the "Dock and Harbor Authority" and lecturer at the University of London on waterways, harbors and docks, will be in attendance this month at the annual convention of the American Association of Port Authorities at Toronto where he is scheduled to deliver an address on "Methods of Cargo Handling at British Ports." Dr. Cunningham has had an extended practical experience in dock and harbor engineering operations at various ports in Great Britain. For sixteen years he was assistant engineer in the service of the Mersey Docks and Harbor Board engaged on the construction of the Liverpool docks. In 1906 he became resident engineer with the London and India Docks Company and continued in this capacity upon the formation of the Port of London Authority. Late last year he left the service of the Port of London Authority in order to take up private practice in partnership with A. Havelock Case of Westminster.



Brysson Cunningham

J. BARSTOW SMULL, vice-president of the Emergency Fleet Corporation in charge of charters and allocations, has been elected president of the Corporation.

W. E. BURKE, in charge of the transportation department of the Canada Steamship Lines, has been appointed general traffic manager of this company with headquarters in Montreal.

COMMANDER F. P. BALDWIN, exclusive surveyor to the American Bureau of Shipping at Valparaiso, Chile, has resigned and will be succeeded by Alexander McBride, acting surveyor.

L. M. BRIMMER, formerly associate manager of the tank steamer department of the United States Shipping Board, has joined the staff of the Pierce Oil Corporation, 25 Broad street, New York.

Generated on 2024-09-12 11:24 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

W. J. LOVE, vice-president in charge of traffic of the Emergency Fleet Corporation, has been named vice-president and general manager.

H. S. KIMBALL, vice-president in charge of finance of the Emergency Fleet Corporation, has resigned. He will, however, act as fiscal agent of the Fleet Corporation in New York where negotiations are now being carried out for settlements with the pioneer purchasers.

H. SCHRECK was recently appointed chief engineer of the Diesel engine department of the Lombard Governor Company, Ashland, Mass. Mr. Schreck received his education at the Technische Hochschule of Berlin and obtained his early practical experience as a marine steam engineer. He has long been associated with the development and operation of Diesel engines having been for many years with one of the prominent shipyards in Germany in whose shops he superintended the manufacture of large Diesel marine units. While in Germany, he was active in the development of the first successful double acting two cycle marine Diesel engine which is still in service. After coming to this country Mr. Schreck entered the Diesel engine department of the Fulton Iron Works, St. Louis, Mo., as assistant chief engineer, later becoming chief engineer. Together with his new duties as chief engineer of the Lombard Company he will continue to act as consulting engineer to the naval architects, Messrs. Whittelsey and Whittelsey of New York.

H. Schreck

CLIFTON M. MCBRIDE, for two years assistant to the southern passenger manager of the International Mercantile Marine Company, has been appointed southern passenger manager to succeed Frederick T. DeCock, who has been transferred to the Baltimore office of the company.

P. H. LACY, formerly district director of the Shipping Board at Boston and later transferred to Savannah, has just been appointed district manager of the north Atlantic district which embraces all the ports between Montreal and Philadelphia. Mr. Lacy's headquarters will be at New York.

SIDNEY HENRY, of Baltimore, director of sales of the Emergency Fleet Corporation, has been appointed to succeed Edward P. Farley as vice-president of the corporation in charge of sales. Mr. Henry graduated from the United States Naval Academy in 1901. After serving several years in the navy, he was appointed vice-president of the Baltimore Dry Docks and Shipbuilding Company, later assuming office with the Fleet Corporation.

ALFRED H. HAAG, marine superintendent for the Atlantic Gulf and Pacific Steamship Corporation of Baltimore, will this month become instructor of a new course in ship construction and operation which has been added to the curriculum of the Johns Hopkins University of Baltimore. Mr. Haag conducts a similar course in the George Washington University.

CALVIN W. RICE, secretary of the American Society of Mechanical Engineers, has been appointed official delegate to the engineering congress to be held in connection with the International Exposition at Rio de Janeiro. For purposes of representation at the Congress Mr. Rice, who will act as emmissary of organized engineering in the United States, has been elected an honorary vice-president of the American Society of Mechanical Engineers. In addition to the American Society of Mechanical Engineers, Mr. Rice will represent at the Congress the Federated American Engineering Societies, the American Institute of Electrical Engineers, the Engineering Foundation, the John Fritz Medal Board, the Engineering Division of the National Research Council, the Engineers' Club of New York City and other organizations.

JOSEPH E. SHEEDY, who has been acting vice-president of the Emergency Fleet Corporation in charge of operations, has been made vice-president of the Corporation. Mr. Sheedy has been connected with the shipping and shipbuilding industries since graduation from the Massachusetts Nautical Training School in 1903. He served as a commissioned officer in the Revenue Cutter Service for six years, resigning in 1901, when he became general superintendent with the Inter-Island Steam Navigation Company. He remained with this company for five years and then assumed the duties of assistant to the general manager of the Seattle Construction and Dry Dock Company. He has also been general manager of the Seattle North Pacific Shipbuilding Company; assistant to the president and general manager of the Downey Shipbuilding Company, and in September, 1921, European manager for the Emergency Fleet Corporation. He is a member of the Load Line Committee of the United States Department of Commerce and a member of leading naval and mechanical engineering societies in the United States.

Joseph E. Sheedy

OBITUARY

FRANCIS S. MARTIN, consulting engineer and naval architect, died on July 27 at his home in Plainfield, N. J., after a two months' illness. He was born at Barrytown, N. Y., in 1852. Mr. Martin was graduated from the College of the City of New York, entered the shipyards of John Roach & Son, Chester, Del., and later was with Harlan & Hollingsworth Company, Wilmington. For the past forty years he has maintained in New York City an office for the surveying, designing, appraising and superintending the construction of ships of all classes. In 1917 Mr. Martin was appointed chairman of the Board of Survey and Consulting Engineers of the United States Shipping Board to take charge were put into American service. Mr. Martin was also for the Shipping Board one of the three members of The Ocean Advisory Board on Just Compensation. Throughout his many years as a marine surveyor, Mr. Martin has been instrumental in deciding many maritime litigations and in all these his position has been synonymous with fairness and justice. During all of his long business career and especially by his valuable services to the United States Government he attained an international reputation for faithfull service to all clients.

Generated on 2024-09-12 11:27 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Shipbuilding, Reconditioning and Operation

Port Expansion, Passenger and Freight Activities and Other Notes of Interest in All Branches of the Marine Industry

Bids to Be Taken This Month for Red "D" Ships ; Three Types of Propulsion to Be Figured

Alternative Proposals Will Be Submitted for Reciprocating, Turbine and Diesel Engines—Principal Features of Machinery Specifications

BIDS were scheduled for receipt in September for the construction of two steel passenger and cargo ships for the Red "D" Line, which have been designed by Theodore E. Ferris, naval architect and marine engineer, of 30 Church Street, New York City. Proposals have been asked for ships propelled by reciprocating, turbine or Diesel engines.

The vessels will each have an over all length of 320 feet, will be of the two-deck shelter deck type, driven by twin screws and will be equipped to carry about 50 first class and 25 second class passengers. The ships will be built to American Bureau classification. Principal details regarding the proposed propulsion installations, for which prices have been asked, are as follows:

RECIPROCATING ENGINES

In the case of reciprocating engines, the machinery will consist of two return tube four-furnace, single-ended Scotch boilers about 16 feet inside diameter by 11 feet 8 inches long, fitted for burning oil, and two vertical, inverted direct acting, three-crank triple expansion engines with cylinders 18 by 29 by 47 inches diameter with 30-inch stroke. The engines are to be capable of making 120 revolutions and to develop a total of about 2,200 indicated horsepower.

The boilers are to be designed for a working pressure of 190 pounds per square inch.

The hull machinery will include a steam windlass, steam and hand steering gear, steam winches, warping winch and deck pumps.

There is to be one main condenser, cylindrical in shape and independent of the main engine, to contain about 3,400 square feet of condensing surface, the tubes to be seamless drawn ¾ inch.

There is to be located in the fireroom one vertical wet uptake starting boiler built for a working steam pressure of 190 pounds per square inch, the boiler to be about 3 feet inside diameter and 101 inches high, to have sufficient capacity for supplying steam to the fire pump and to run the oil fuel burning system. This boiler will be coal fired. The furnace fronts of each main boiler are to be arranged for burning oil fuel, interchangeable to coal burning, on the White, Dahl, Coen or other approved system.

MOTORSHIP MACHINERY

As motorships, the vessels will be driven by twin screws each propeller being driven by one six-cylinder four-cycle Diesel oil engine of the Polar type, manufactured by the McIntosh & Seymour Corporation, each engine being capable of developing 900 shaft horse-power making 140 revolutions per minute.

The auxiliaries in this case will be electrically driven and will comprise auxiliary engine, generator and compressor;

Each engine will be of the heavy duty marine type Diesel, with cylinders 22 inches in diameter and 32 inch stroke. They will be of the inclosed type with three stage compressors mounted on the forward end and driven from the crank shafts.

The auxiliary boiler to be located in the engine room will be of the vertical wet uptake or return tube type fitted with corrugated furnaces and having sufficient capacity to furnish steam at 150 pounds pressure. It will be oil fired and contain about 600 square feet of heating surface.

TURBINE PROPULSION

If turbine engines are decided upon the machinery will be a twin screw installation consisting of two independent sets of the latest design De Laval double reduction gear steam turbines and two cylindrical, return tube Scotch boilers, 16 feet 8 inches inside diameter by 11 feet long, the boilers being built for a working pressure of 185 pounds per square inch with 150 degrees of superheat and one starting boiler of the vertical wet uptake type, 3 feet inside diameter by about 101 inches high, built for 175 pounds per square inch working pressure.

Each turbine set will consist of one high pressure ahead and astern turbine unit driving a pinion through a double reduction gearing. The revolutions of the turbines at full speed ahead will be 4,000 per minute developing not less than 2,000 shaft horsepower and driving the propeller at 115 revolutions per minute.

The boilers will be arranged for burning oil fuel, interchangeable for coal burning, on the White, Dahl, Coen or other approved system and will also be fitted with the Howden's system of heated forced draft. Provisions are also made for the necessary auxiliary machinery, pumps, etc.

Main condensers will contain about 1,600 square feet of cooling surface and will be fitted with tubes ¾ inch outside diameter, the auxiliary condenser containing about 1,200 square feet of cooling surface with tubes ¾ inch outside diameter. There will be two 8-inch diameter main circulating pumps driven by vertical single-cylinder engines.

The two main boilers will be of the four furnace marine type.

Cleveland Yard to Build Another Steel Freighter

THE American Shipbuilding Corporation, of Cleveland, Ohio, has been awarded a contract by Pickands Maher & Company, of Cleveland, for the construction of a 600-foot steel cargo carrier for use on the Great Lakes.

The ship will have a deadweight tonnage of approximately 12,000, driven by a triple expansion reciprocating steam engine, and makes the fifth ship of this type contracted for in the Lake district so far this year. It is expected she will cost about $800,000.

Contract Placed with Federal Yard for Nine Boilers

THE contract for the construction of nine boilers has been awarded to the Federal Shipbuilding Company, of Kearny, N. J., by the Luckenbach Steamship Company. For what particular purpose the boilers are being constructed was not announced.

The boilers will be of the Scotch marine type, 17 feet 6 inches in diameter by 13 feet long and will be built for 225 pounds pressure. Each will have four 44-inch furnaces and will be oil burning, using forced draft. The boilers will be equipped with 2½-inch tubes and will have 4,380 square feet of heating surface. It is understood that they will be built at a total cost of approximately $170,000.

Single Screws, Motor Driven, for Two Munson Liners

IT is learned that the Munson Line, which was considering two alternative propositions with regard to the conversion to motorships of the steamships *Courtois* and *Covedale*, has decided to convert the vessels into single screw ships, the *Courtois* having arrived at the plant of the Sun Shipbuilding Company, Chester, Pa., during the past month.

The *Courtois* will be equipped with one of the two 900-brake horsepower McIntosh & Seymour oil engines purchased by the Munson Line from the Shipping Board. The engine is of the four-cycle six-cylinder type developing 140 revolutions and is expected to drive the ship at about 8 knots. A new Scotch auxiliary boiler having about 1,000 square feet of heating surface will be installed. The work will cost about $60,000.

Generated on 2024-09-12 11:25 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Chairman Lasker Announces Changes In Shipping Board

A. D. LASKER, chairman of the United States Shipping Board, has made the following announcement of changes in the personnel of the Emergency Fleet Corporation:

H. S. Kimball, New York, vice-president in charge of finance, has resigned, to become effective at once. He will, however, act as fiscal agent of the Fleet Corporation in New York, where its largest accounts are located and where negotiations are now being carried out for settlements with the pioneer purchasers. He will be succeeded by his assistant, Col. Joseph W. McIntosh, Chicago, former chief of subsistance of the U. S. Army, who now becomes a trustee of the Fleet Corporation.

Edward P. Farley, Chicago, vice-president in charge of sales, has also resigned, to become effective at once. Mr. Farley, it is understood, is to return to private business. He will be succeeded by Sidney Henry, of Baltimore, now director of sales, who now becomes a trustee of the Fleet Corporation. Mr. Henry is a graduate of the Naval Academy, class of 1901.

Mr. Lasker stated that Vice-president J. Barstow Smull, in charge of charters and allocations, has been elected president of the Fleet Corporation, and W. J. Love, now vice-president in charge of traffic, has been named vice-president and general manager.

Referring to the reported severance of the connection of August F. Mack with the Fleet Corporation, as district manager of the New York district, Mr. Lasker stated that Mr. Mack had agreed to remain with the Fleet Corporation for an indeterminate period.

Diesel Passenger and Freighter Is Contracted For

THE contract for the construction of a motor driven combination freight and passenger vessel has been awarded to the Murnon Shipbuilding Company, of Mobile, Ala. The vessel will be 120 feet long, driven by two 120-horsepower Kahlenburg Diesel motors. The vessel was designed by Cox & Stevens, naval architects, New York City.

Sun Shipbuilding Company Is Lowest Bidder for Construction of Four Diesel Electric Dredges

Chester, Pa., Company's Prices Lead Field of Sixteen Bidders Including Four Navy Yards—All Seaboard Sections of Country Represented in Competition

WITH a price of $653,080 for one; $1,300,160 for two; $1,920,240 for three, and $2,528,240 for four, the Sun Shipbuilding Company, of Chester, Pa., submitted the lowest bid for the construction of seagoing Diesel-electric hopper dredges for the Government, at the opening of tenders by the Chief of Engineers, War Department, Washington, D. C., on August 2. The Boston Navy Yard submitted the second lowest bid with a price of $2,610,000 for four vessels, and the New York Navy Yard submitted the highest bid for the four vessels, at $3,631,708.

Sixteen tenders were submitted, including four navy yards. The bids are as follows:

Bidder	1 Dredge	2 Dredges	3 Dredges	4 Dredges
Sun Shipbuilding Co., Chester, Pa.	$653,080	$1,300,160	$1,920,240	$2,528,240
Boston Navy Yard, Boston, Mass.	.....	.....	.....	2,610,000
Todd D. D. & Constr. Co., Tacoma, Wash.	750,000	1,433,000	2,107,000	2,676,000
Bethlehem Shipbldg. Corp., New York .	742,000	1,458,000	2,140,000	2,798,000
Merchant Shipbldg. Co., Chester, Pa. ..	799,000	1,499,000	2,159,000	2,799,000
Puget Sound Navy Yard	775,000	.....	.....	2,900,000
Newport News S. B. & D. D. Co.	.....	1,532,000	2,255,000	2,976,000
Staten Island Shipbuilding Co.	783,000	1,519,000	2,250,000	2,980,000
Federal Shipbuilding Co.	861,999	1,617,104	2,335,290	3,033,648
Moore Shipbldg. Co., Oakland, Cal. ..	861,925	1,674,150	2,484,375	3,265,100
Bath Iron Works, Bath, Me.	963,000	1,818,000	2,672,000	3,527,000
New York Shipbldg. Corp., Camden, N. J.	978,500	1,835,000	2,691,000	3,547,000
Los Angeles S. B. & D. D. Co.	948,000	1,828,000	2,698,000	3,578,000
New York Navy Yard, Brooklyn, N. Y.	.....	1,907,269	.....	3,631,708
Mare Island Navy Yard	869,397	1,678,833	.....	.....
H. E. Crook Co., Inc., Baltimore, Md. ..	874,000	1,710,000	.....	.....

Charleston Yard Lowest Bidder for New Dredge Hull

THE Charleston Dry Dock & Shipbuilding Company, Inc., of New Orleans, with a price of $25,850, submitted the lowest tender for the construction of a steel dipper dredge hull for the United States District Engineer Office, Montgomery, Ala. Proposals were opened at 11 a.m., on July 31, the bids submitted being as follows:

Charleston Dry Dock & Shipbuilding Co., Inc. (New Orleans)	$25,850
Tampa Shipbldg. & Engineering Co.	29,000
Charleston Dry Dock & Machine Co.	33,921
Milwaukee Bridge Co.	36,450

Coast Guard May Build New Ship; to Overhaul Seminole

THE construction of a new Coast Guard cutter and the reconditioning of one of this type of vessel now in service is in contemplation by the United States Coast Guard Service, at Washington, D. C. Whether or not a new construction contract will be placed this fall depends upon the action of Congress on the bill recently introduced for the construction of a new cutter to replace the *Bear*.

The Coast Guard Service also expects to place the cutter *Seminole* out of commission this fall for the purpose of reconditioning and general overhauling before she assumes duty on a new station to be determined later.

Reboilering and Reconditioning of Coast Guard Cutter Gresham Goes to Staten Island Shipbuilding Co.

THE Staten Island Shipbuilding Company has been awarded the contract for reboilering and reconditioning of the United States Coast Guard cutter *Gresham*, following the recent opening of bids at Washington, D. C.

Three proposals were submitted, Bid No. 1 dealing with items of work directly related to converting the *Gresham* into an oil burning vessel; Bid No. 2, hull repairs such as outside plating and work upon which no lump sum bid could be expected; and Bid No. 3, items not necessarily related to the conversion of the vessel to burn oil. The prices submitted were as follows:

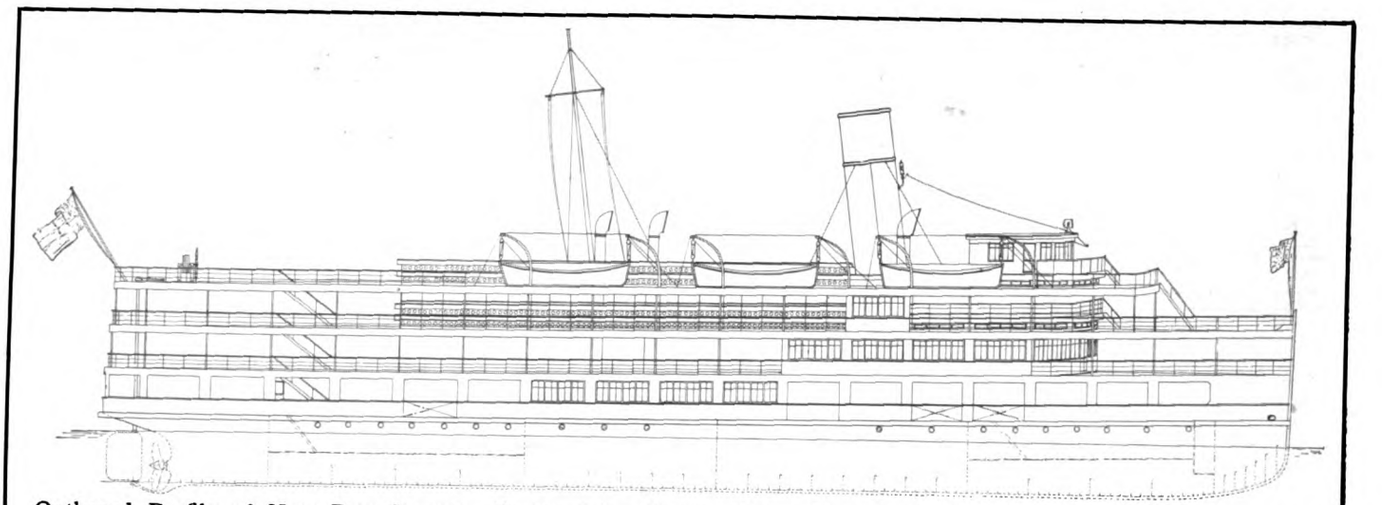
List of Bidders	Bid No. 1	Bid No. 2	Bid No. 3
Newport News	$60,705	15	$44,730
Todd Shipbuilding Corp.	68,350	25	29,500
Morse Dry Dock & Repair Co.....	75,670	22	37,350
Maryland Dry Dock	67,578	24	37,311
Staten Island Shipbuilding Co.....	71,500	30	21,400
Bethlehem Shipbuilding Co.....	81,847	25	36,953
Sun Shipbuilding Co.	85,080	20	41,065
Federal Shipbuilding Co.	92,890	20	21,984
W. & A. Fletcher.....	85,000	22	45,000

Fletcher Yard to Convert Carfloat Into a Hospital

THE W. & A. Fletcher Company, Hoboken, N. J., has been awarded the contract for the conversion of a car float into a floating hospital for the Auxiliary of the Tubercular Division of Bellevue Hospital, which is under the direction of Dr. James Alexander Miller. Plans and specifications for the work were prepared by the firm of Cox & Stevens, naval architects, New York City, who will also have supervision of the conversion.

The vessel is 240 feet in length with 60 feet beam, upon which a two-story structure, to have in it wards, recreation rooms, etc., will be built. The contract, which involves about $40,000, is scheduled for completion early in the fall.

Generated on 2024-09-12 11:46 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN



Outboard Profile of New Day Steamer, Designed by George Sharp, New York Naval Architect, for Wilson Line.

Pusey & Jones Low Bidder for Construction of 3,000-Passenger Steamer for Use on Delaware River

George Sharp, New York Naval Architect, Designs Vessel With New Features for Wilson Line—Ship Will Be 220 Feet in Length, Built of Steel and Steam Driven

THE Pusey & Jones Company, of Wilmington, Del., with a total price of $529,000 for two day passenger steamers driven by reciprocating engines and $599,000 for the same steamers if driven by turbine engines, submitted the lowest bids for new vessels for the Wilson line, of Wilmington and Philadelphia, at the opening of tenders on August 17. The bids were received by George G. Sharp Company, naval architects and consulting engineers, 30 Church street, New York City, who designed the vessel.

The proposed vessel is designed to carry 3,000 passengers. She will be a single screw steamer equipped with triple expansion steam engines and watertube boilers, to develop a speed of 18 statute miles and will have a length of about 220′ 0″. The vessel will be built of steel throughout with three complete passenger decks and shade or boat deck.

The men's smoking room, ladies' cabin and lavatories will be situated on the main deck, along with luncheon counter, and on the saloon deck there will be a large open air ball-room 84 feet long by 36 feet wide without obstruction of any kind except bandstand. Forward of the dancing space on this deck, there will be a large observation and refreshment room extending the full width of the vessel. The remainder of the deck forward and aft and at sides of dancing space will be available for passengers.

Above the saloon deck is the observation deck, which is entirely open. One of the features for the comfort of passengers is that this deck is terraced at three levels giving unobstructed vision to all passengers, the levels of the shade deck being arranged in a similar manner and the space between the different levels being open permits of the free circulation overhead of air and light to the passengers on the observation deck.

Bids to Be Asked This Fall for Two Clyde Line Ships

INFORMATION obtained recently by MARINE ENGINEERING AND SHIPPING AGE leads to the belief that bids will probably be asked early in the fall for the construction of two coastwise passenger and freight ships for the Clyde Line.

Unofficial estimates placed the probable cost of these vessels at about $1,500,000 each. Theodore E. Ferris, naval architect and marine engineer, of 30 Church Street, New York City, has begun the work of preparing tentative plans and specifications for these proposed vessels although it is not thought likely that they will be put out for bids before October.

It is understood that the new ships will be about 425 feet in length, of the same general type as the Clyde Line steamship *Lenape*, with larger and more extensive passenger accommodations and greater speed. Propulsion will probably be by turbine engines and the new ships will replace the steamships *Apache* and the *Arapahoe*.

Federal Yard Is Awarded Standard Oil Repair Job

THE Federal Shipbuilding Company, of Kearny, N. J., has been awarded the contract for repairs to the steamship *S. B. Hunt*, of the Standard Oil Company of New Jersey, following the opening of bids on August 9.

Alderton Company Is Low Bidder for Invincible Repairs

THE Alderton Dry Dock Company submitted the low bid for the work of general overhauling of hull and engines on the electric-drive ship *Invincible*, at the opening of tenders by the Shipping Board, at 45 Broadway, New York, on August 8.

Staten Island Co. Gets Repair Job on Steamer Suboatco

THE Staten Island Shipbuilding Company, with a price of $13,590 and 10 days' time, was awarded the contract for repairs to the freight steamer *Suboatco*, of the Transmarine Corporation, following the opening of bids by that company at 5 Nassau Street, New York, on August 8.

Tietjen and Lang Yard Awarded Oil Conversion Contracts

THE steamships *Medina*, of the Mallory Line and the *Pawnee*, of the Clyde Line, are at the Tietjen & Lang plant of the Todd Shipyards Corporation, Hoboken, New Jersey, for conversion from coal to oil burning.

Aero Alarm Co. Gets Installation on S. S. Leviathan

THE Aero Alarm Company, Inc., of Seattle, Washington, through its New York office, has been awarded the contract by the Newport News Shipbuilding Company for installation of the Aero alarm system on the steamship *Leviathan*, now undergoing reconditioning at Newport News, Va. The company is also making additions to the Aero alarm system on the steamships *America* and *George Washington* and has contracted through its Los Angeles office to extend the system on the Admiral Line steamship *Ruth Alexander*.

Through its Los Angeles office, the same company has installed the Aero system on the steamships *Yale* and *Harvard;* will extend the Aero alarm system on the steamship *City of Los Angeles*, and through its Seattle office has been awarded the contract to extend the system on the steamships *President Madison* and *President Cleveland*.

Generated on 2024-09-12 11:23 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Marine Construction News of the Month

Ship Contracts — New Ship Concerns and Shipyard Improvements—Terminal Projects—Government Contracts

SHIPS AND SHIPBUILDING

Steamship Drydocked, Chester, Pa.—American steamship Argus was drydocked at Sun Shipyards for repairs.

Crowley Contracts, San Francisco, Calif.—Three sub-chasers and cutter Tulare were taken to Crowley yards for overhauling.

Propeller Fitted, Baltimore, Md.—Lighthouse tender Maple was hauled at Spedden's shipyard to be fitted with new bronze propeller.

Schooner Drydocked, Los Angeles, Calif.—Four-masted steam schooner Ella A. was drydocked for hull cleaning, painting and general repairs.

Steam Schooner Drydocked, San Francisco, Calif.—Steam schooner Fort Bragg was drydocked on ways of the Barnes & Tibbitts dock to undergo overhauling.

Repairs to Lighthouse Tender, Norfolk, Va.—Lighthouse tender Orchid went to yard of Norfolk Shipbuilding and Dry Dock Company for docking and repairs.

Contract Awarded, Brooklyn, N. Y.—Morse Dry Dock and Repair Company was awarded contract for overhauling and reconditioning the steamship City of Alton.

Tanker Drydocked, San Francisco, Calif.—British tanker El Grillo went to Bethlehem yards to be drydocked for cleaning and painting and to have tailshaft drawn.

Steamer Overhauled, West Coast.—U. S. Quartermaster steamer Captain Anton Springer went to Georgetown shipyard to undergo general overhauling.

Launching of Ship, Wilmington, Del.—The first of two ships, contracted for by Pusey & Jones for the Seaboard-Bay Line, was launched July 25. The ship will be the State of Maryland.

Contract Awarded, Wilmington, Del.—Pusey & Jones Shipbuilding Company was awarded contract to construct a steel floating grain elevator, 100 feet long, for the Pennsylvania Railroad.

Contract Awarded, Kearny, N. J.—Federal Shipbuilding Company was awarded contract for repairs to the steamship S. B. Hunt, of the Standard Oil Company of New Jersey. Price $15,738.

Temporary Repairs, San Pedro, Calif.—Crowell & Thurlow freighter William A. McKenney, damaged in collision, went to Los Angeles Shipbuilding and Dry Dock Corporation for temporary repairs.

Reboilering and Reconditioning, Staten Island, New York.—Staten Island Shipbuilding Company was awarded contract for reboilering and reconditioning United States Coast Guard cutter Gresham.

Bids for Two Clyde Line Ships.—Bids will probably be asked early in the fall for construction of two coastwise passenger and freight ships, 425 feet long, for Clyde Line. Approximate cost, $1,500,000 each.

Steamship Conversion, Brooklyn, N. Y.—Steamship Comus, of the Southern Pacific Steamship Company, went to the plant of Robins Dry Dock & Repair Company to be converted from coal to oil burner.

Steamer Repairs, Staten Island, N. Y.—Staten Island Shipbuilding Company, with price of $13,950 and 10 days' time, was awarded contract for repairs to freight steamer Suboatco, of the Transmarine Corporation.

Newport Shipbuilding Contracts, Newport News, Va.—Plant of Newport News Shipbuilding & Dry Dock Company repaired steamship Deepwater, from Constantinople, schooner Moonlight and steamers Cowan and Comparte.

Robins Shipyard Awarded Repairs, Brooklyn, N. Y.—Robins Dry Dock & Repair Company, of the Todd Shipyards Corporation, was awarded contract for repairs to the British steamship Andree. Price $45,850. Time 24 days.

Conversion to Motorships, Chester, Pa.—Steamships Covestale and Courtois, recently purchased by Munson Line from Shipping Board, were awarded to Sun Shipbuilding Company for work of conversion to motorships.

Turbine Engine Overhauling, Seattle, Wash.—Shipping Board awarded contract to Todd Drydocks Corporation plant at Harbor Island, Washington, for purpose of having her turbine engines completely overhauled.

Conversion to Oil Burner, Mobile, Ala.—Steamer Osage, of Moore & McCormack fleet, is to be changed from a coal burner to an oil burner and generally reconditioned by Todd Shipyards Corporation, at cost of $60,000.

Steel Hull for Steamer, Jeffersonville, Ind.—Howard Shipyards, of Jeffersonville, Ind., was awarded contract for construction of a steel hull for the excursion steamer East St. Louis, to be placed during the winter.

Dredge Repair Contract, Oakland, Calif.—The Hanlon Dry Dock & Shipbuilding Company was awarded contract by United States Engineer for repairing two 20-inch pipe line dredges and auxiliary floating plant. Price $2,176.

Trial Trip, Poughkeepsie, N. Y.—The official trial trip of the new ferryboat Poughkeepsie took place from the foot of Main street, Poughkeepsie, N. Y. The boat will go into service for the Poughkeepsie and Highland Ferry Company.

Contract Awarded, Oakland, Calif.—Shell Oil Company awarded contract to Union Construction Company for a 4,000-barrel oil barge costing $175,000. Barge to be used for bay transportation. She will probably be completed in September.

Fireboat, New Orleans, La.—The Johnson Iron Works, Dry Dock & Shipbuilding Company, Inc., was awarded contract for construction of steel screw fireboat for city of New Orleans. Price $264,447, boat to be completed in 220 days.

Annual Inspection, San Francisco, Calif.—Captain Andrew Dixson's yacht and the lumber carrier Brooklyn of Sudden & Christenson, went to Barnes & Tibbets yards, the latter vessel to undergo annual overhauling, drydocking and inspection.

Contract Award, Newport News, Va.—The Newport News Shipbuilding & Dry Dock Company was awarded contract for construction of two combination passenger steamers for Ocean Steamship Company, of Savannah. Price $920,000 each ship.

Contracts on West Coast.—New tanker F. H. Hillman of the Standard Oil Company went on drydock at Hunter's Point for minor adjustments and the Casco of Swayne & Hoyt's fleet went on No. 3 drydock of the Bethlehem Shipbuilding Company.

Repairs and Inspection, Johnson Dry Docks.—The Cuban steamers Ramon Miramon and Edourdo Sala, recently purchased by D. Sullivan and Company, of Chicago, for operation on the Great Lakes, underwent repairs and inspection by government steamboat inspectors at the Johnson Docks.

Conversion to Cableship, Seattle, Wash.—War Department contract for converting steamship Dellwood into a cableship went to Todd Dry Docks, Incorporated, of Seattle. The Dellwood is one of 8,800-ton cargo steamers built for the Shipping Board during the war. Amount of expenditure involved is $200,000.

Conversion Contracts, Hoboken, N. J.—Tietjen & Lang, of Todd Shipyards Corporation, were awarded contract for reconditioning steamships Medina, of the Mallory Line, and Pawnee, of the Clyde Line, from coal to oil burners. Approximate cost, $100,000. The yard also installed Best oil burning system in New York Central tug No. 18.

Steel Freighter, Cleveland, O.—The American Shipbuilding Corporation, of Cleveland, Ohio, was awarded contract by Pickands, Maher & Company, of Cleveland, for construction of a 600-foot steel cargo carrier for use on Great Lakes. Deadweight tonnage about 12,000, driven by triple expansion reciprocating steam engine. Probable cost, $800,000.

Carfloat Conversion, Hoboken, N. J.—W. & A. Fletcher Company, Hoboken, N. J., was awarded contract for conversion of car float into a floating hospital. Plans and specifications prepared by Cox & Stevens, naval architects, New York City. Vessel is 240 feet long, 60 feet beam. Two-story structure, to have wards, recreation rooms, etc. Price about $40,000.

Construction of Tugs, Brooklyn, N. Y.—Orders for construction of three steel single screw tugboats for the New York Central were placed with the Tebo plant, of the Todd Shipyards Corporation. Delivery expected end of January, 1923. Boats to be oil burning equipped with Todd merchanical oil burners. Over all length 108 feet, beam 25 feet 6 inches, molded depth 12 feet 9 inches.

Construction Contract, Mobile, Ala.—Contract for the construction of a motor-driven combination freight and passenger vessel was awarded to the Murmon Shipbuilding Company, of Mobile, Ala. Vessel will be 120 feet long, driven by two 120 horsepower Kahlenburg Diesel motors. Designed by Cox & Stevens, naval architects, New York City. Scheduled for delivery in November.

Work at Union Iron Works, San Francisco.—Ferryboat San Mateo, constructed by Union Iron Works for Six-Minute Ferry Company, went on drydock for minor adjustments. Contract was awarded the Union Iron Works for repairs to the Matson liner Wilhelmina, damaged in collision with steamer Maui. More than 110 feet of deck rail on the starboard side, as well as stanchions, were to be replaced.

Shipyard Activities, West Coast.—Freighter Grace Dollar went on Hunter's Point Drydock to have tail shaft drawn and undergo general repairs. Tanker William F. Herrin and steamer Northland went to Union Iron Works drydocks for cleaning, painting and general overhauling, and steam schooner Claremont of Hart-Wood Lumber Company went to Alameda plant of the Bethlehem yards to undergo hull repairs.

New York Harbor Work.—A Munson Line tug was awarded to the New York Harbor Dry Dock Company for completion, the work including installation of oil engines, bulkheads and tanks, putting on of superstructure, etc., at a total cost of close to $12,000. The vessel will be used in Cuban waters. The shipyard was also awarded the job of reconditioning the Shipping Board steamer West Elcasco at a price of $7,835.

Refrigeration Space on Steamship, Chester, Pa.—Sun Shipbuilding Company, of Chester, Pa., was awarded contract to insulate and convert steamship San Lorenzo, of the New York and Porto Rico Steamship Company, into an air-cooled freight carrier. Brunswick Refrigerating Company's machinery will be used and ship will have about 120,000 cubic feet of cargo space. Price submitted $138,768; time 60 running days.

To Build New Tug, West Coast.—David W. Dickie, naval architect, completed specifications for new tow boat to be built for Coos Bay Lumber Company. Tug was designed for towing purposes and will contain a 165 horsepower engine, with a hull fifty-seven feet long and sixteen-foot beam. Vessel will have a very large engine room and be controlled from the pilot house. Craft will cost about $30,000 and will be used to tow log rafts from Oakland harbor to Bay Point.

Generated on 2024-09-12 11:23 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

Conversion Into Single Screw Ships.—Munson Line will convert steamers Courtois and Covedale into single screw ships. Courtois went to Sun Shipbuilding Company, Chester, Pa., to be equipped with one of the two 900-brake horsepower McIntosh & Seymour oil engines purchased from the Shipping Board. New Scotch auxiliary boiler having about 1,000 square feet of heating surface will be installed. Work to cost about $60,000.

Contract Awarded, San Francisco, Calif.—Standard Oil Company has awarded contract to the Bethlehem's California yard for the construction of a tank vessel of 12,000 barrels' capacity. The boat is to be finished by December. It will be equipped with an electric drive from two generators driven by two Werkspoor Diesel engines. The new ship is to have a length of 230 feet, beam 40 feet, depth 16 feet 6 inches and a speed of 10 knots. She will trade up and down the Pacific Coast.

Repair Contracts, Hoboken, N. J.—Steamship Cour d'Alene, of the Bull Line, went to W. & A. Fletcher Company's yard to be drydocked, have stem taken out and straightened, replaced, crumpled plates made good and fore peak tanks proved tight. The yard was also awarded Bull Line steamship Ellenor for repairs, steamship Elizabeth of the same line for general repairs, Shipping Board steamship Lavada, steamship Mount Carroll of the United American Line and the Standard Oil barge Socony No. 86.

Steamer Wanted, Ecuador.—An Ecuadorean firm is inquiring in southern marine circles to ascertain if they can purchase a new or second-hand oil burning steamer with accommodation for between thirty and forty passengers in the first class, fifteen to twenty-five in the second class and with cargo space for about 150 head of cattle and at the same time capable of maintaining a speed of ten to sixteen knots. Vessel will probably be placed in trade between Ecuador and the Galapagos Islands. The name of the intending purchaser or further details may be secured from Mr. George H. McCloud, United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 214 Custom House, New Orleans, La.

SHIPYARDS AND DRY DOCKS

Corporation to Enlarge Plant, Staten Island, N. Y.—New York Harbor Dry Dock Corporation plans to install an additional 10,000-ton dock at its plant in Rosebank, Staten Island, adjoining the twelve new piers just completed by the City of New York. To provide additional berthing space required, an additional tying-up pier will also be constructed. The corporation has purchased the two 10,000-ton drydocks previously leased from the Shipping Board. One and three-quarter million dollars of new money has been put into the enterprise and a larger corporation has been formed. When shipping conditions improve, the new company anticipates increase in its repair work of both American-owned ships and foreign ships.

Dry Dock Company to Move Plant, Mobile, Ala.—Alabama Dry Dock and Shipbuilding Company will transfer all of its operations to Pinto Island, moving all of its big machinery of the machine shop, plate shop and other departments now located on the west side of Mobile river to the island where the large dry docks of the firm are located. R. D. Dunlap, president of the company, announced that the entire plant will be located on the east side of the river. At the Pinto department the Alabama firm has its large 10,000 ton sectional dry dock, its large Pinto dock and several smaller dry docks. With the removal of all departments to the Pinto site, the company will better be able to take care of its big repair jobs. The Alabama firm will keep only one department on the west side of the river. The small cradle ways at this department, used in hauling out sailing vessels and small steam craft, will be the only part of the big ship repair and dry docking concern to be left on that side. Considerable money will be spent in the erection of new buildings and installing machinery at the Pinto Island plant, according to a statement by Mr. Dunlap.

PORT IMPROVEMENTS

Seawall, Aransas Pass, Tex.—Attorney General's Department, Austin, approved $213,000 bond issue for seawall. Address Mayor.

Harbor Contract Planned, Norfolk, Va.—Three hundred thousand dollars each has been allotted for improvement of Thimble Shoal Channel and Norfolk Harbor.

Wharfing Facilities, Seattle, Wash.—Ames Shipbuilding & Dry Dock Company has been granted permission to extend the present wharfing facilities at their site 509 feet, work to be started at once, it is understood.

Contract Award, Portland, Me.—Directors of Port of Portland, 67 Commercial street, awarded contract for construction of north and south sheds and grain conveyor gallery, State Pier, Contract 10, to M. A. Long Company, 1523 Munsey Building, Baltimore, Md.

Dredging, Brooklyn, N. Y.—Superintendent of Public Works, Albany, N. Y., awarded contract to Taylor Dredging Company, Communipaw Ave., Jersey City, N. J., for dredging portion of Henry Street Slip at Gowanus Bay, Terminal Contract 90. Price $19,085.

Seawall, Annapolis, Md.—Specification 4621.—Bureau of Yards and Docks, Navy Department, Washington, D. C., awarded contract for constructing a seawall at Naval Academy to McLean Contracting Company, Fidelity Building, Baltimore, Md. Price $14,350 (120 days).

Contract Awarded, Chicago, Ill.—Great Lakes Dredge & Dock Company, 104 South Michigan avenue, Chicago, Ill., was awarded contract by Harbor & Dock Commissioner, of Troy, N. Y., for constructing dock wall, also improving and regulating river and dock front at Troy. Price $582,795.

Contract Awarded, Brooklyn, N. Y.—J. H. Delaney, Commissioner of Docks, Pier "A," North River, New York, awarded contract to Riverside Contracting Company, 164 Montague street, for building ramp and dumping board at foot of West 23d street, Coney Island Creek, and completing dredging.

Pier Contract Placed, Norfolk, Va.—J. T. Nichols Company, Richmond, Va., was awarded contract for rebuilding Chesapeake & Ohio pier and warehouse, burned at Norfolk, several months ago. Amount of contract not made public, believed to be not less than $125,000. New pier and warehouse will be of fireproof, constructed of reinforced concrete and steel, 450 by 52 feet, approximately, and will more than compensate for space lost when original structure burned.

Port Developments and Improvements, Texas.—A total appropriation of $1,571,000 has been authorized by the Rivers and Harbors Commission for the development and maintenance of Texas ports. The appropriation includes $750,000 for completion of the Houston ship channel, $240,000 for maintenance work on Galveston harbor and channel, $100,000 on Texas City harbor and channel, $20,000 for Port Bolivar, $300,000 for Beaumont, Port Arthur and Orange, $61,000 for Caddo Lake dam and $100,000 for other projects.

New Orleans Improvements.—Projects on the city front under way, authorized by the dock board or for which plans have been completed call for an expenditure of $2,200,000, according to Mr. Walsh, general manager. By the end of the year this entire project will be in full swing. Meanwhile plans are to be drawn for other improvements on the city front, the financing for which was provided by the dock board last December, shortly after the board was reorganized under the new state law. The work at the four wharves mentioned will require expenditure of $1,500,000. Plans have been approved for reconstructing the Seventh Street landing, building a shed, and rat-proofing the wharf, at a cost of $250,000. The Robin street shed is to be rat-proofed and widened, sheds added at Celeste and Market streets, and the latter wharves also rat-proofed, in addition to the raising of the levee.

NEW INCORPORATIONS

Harlem Navigation Company, capital $140,000, chartered in Delaware.

The Braeger Shipping Company, of Manhattan, capital $100,000, chartered at Albany, to do business as export freight contractors and brokers. F. Braeger, W. Proksch and A. Begg, incorporators.

The United States Trade Line Company, capital $1,000,000, chartered under Delaware laws to operate boats. New York Register & Transfer Company, attorneys.

Norma Steamship Corporation, capital $150,000, chartered under Delaware laws. Incorporators: Alva F. Wallander, H. Victor Crawford, and George C. Sprague. Mr. Crawford and Mr. Sprague, lawyers, with offices at 120 Broadway, New York City.

FOREIGN ACTIVITIES

New Vessel, Scotland.—Tenders have been called for among Clyde shipbuilders by a shipowning company who are in the market for a 12,000-ton ship.

Doxford Vessel Launched, England.—Messrs. William Doxford and Sons, Ltd., Sunderland, launched another of the Doxford standard vessels for the Moor Line, Ltd., managed by Messrs. Walter Runciman and Company, Ltd. Dimensions, 450 feet by 54 feet by 37 feet; closed shelter deck type, 10,800 tons on 28¼ feet draft; 12 knots trial speed. Vessel was named Castlemoor.

Exceeds Contract Speed, Canada.—New Canadian Pacific turbine steamer Empress of Canada, recently built on the Clyde by Fairfield Shipbuilding and Engineering Company at cost of over two millions sterling, completed her first trip across the Pacific without a hitch. She averaged 19.75 knots, engines developing 21,000 horsepower and passed previous record on the eastbound trip across the Pacific by 8½ hours.

Conversion of German Warship.—The Ægir, recently placed in commission, was converted to motor cargo-carrying ship. Last year the Odin was similarly made over and has been engaged in conveying locomotive and other material from Germany to Russia. The decks of the Ægir were cut out and steam machinery was replaced by two Benz-Diesel engines, each 350 horsepower. The vessel can carry twelve locomotives and tenders, former being placed on removable rails on deck.

Contract for Three New Vessels, England.—The United Fruit Company has placed contracts for the construction of three large passenger and cargo steamers, to ply between the Caribbean and Boston, with Cammell, Laird & Co., Ltd., of Birkenhead, England. The ships are to be finished in about a year. They will be 325 feet long, 48 feet breadth of beam and 31.9 feet depth of hold; equipped with four 750-horsepower Diesel electric engines. The British Thompson, Houston Company, an associate company of the General Electric, will furnish the electric drive.

Steel Screw Hopper Barge, England.—Steel screw hopper barge No. 18, first of three vessels which the Monmouth Shipbuilding Company, Ltd., Chepstow, are building for Port of London Authority, was launched recently. Vessel is of single-deck type, with raised forecastle and large hopper placed amidships for carrying dredgings. Dimensions are: Length between perpendiculars 215 feet, breadth molded 35 feet 6 inches, depth molded 19 feet 3 inches, mean draft 16 feet. Propelling machinery consists of one set of triple expansion surface condensing engines, capable of propelling vessel at speed of 10 knots.

Tanker Launched, England.—Sir W. G. Armstrong, Whitworth and Company, Ltd., launched from their Armstrong yard the steel screw tanker Amsterdam, built to order of American Petroleum Company, Rotterdam. Principal dimensions of vessel are: Length overall 455 feet, length between perpendiculars 440 feet, breadth extreme 57 feet 6 inches, depth molded to upper deck 33 feet 11 inches. She will be fitted with triple expansion machinery, steam being supplied by three boilers working at 180 pounds pressure and capable of propelling the vessel, when loaded with 10,450 tons, at speed of about 11 knots on mean draught of 26 feet 3 inches.

German Shipbuilding Figures.—Since the beginning of March, 1922, 19 large steamers representing a total of more than 100,000 tons have been launched from German shipyards for account of German navigation companies. Since the same date the Germans have purchased abroad about 35,000 tons. The amount of steamers actually under construction at German yards represent a total of more than 300,000 tons. The tonnage built in the year 1920 was about 500,000, exceeding by about 40,000 tons the total construction of the year 1913. The present productive capacity of the German shipbuilding yards is estimated to be at least 700,000 tons per annum.

Generated on 2024-09-12 11:23 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN

STEAMSHIP INTERESTS

The shipping department of the Hugo Stinnes interests plans to open in October a new line from Hamburg to Singapore, Shanghai and Yokohama.

A. Miller McDougal, shipbuilder, has announced plans to establish next spring a refrigerator and package service with a fleet of modern freighters plying between Duluth and the Atlantic.

At the request of Portland shippers, the Shipping Board has allocated three additional vessels to the Columbia Pacific Shipping Company for Trans-Pacific service. This will give the concern two sailings a month to the Orient from Portland.

With the sailing of the *City of Los Angeles* from Los Angeles on September 9, the Los Angeles Steamship Company will inaugurate a passenger and freight service to Honolulu. The *City of Los Angeles* drydocked at Los Angeles Shipbuilding Company to undergo reconditioning. Upon the arrival of the *City of Honolulu*, from New York, at Los Angeles, the ship went into the same yards to be overhauled. The *City of Honolulu* will sail on September 23, according to present schedule.

The yacht *Cynthia*, designed by Cox and Stevens and built by the Todd Shipyards Corporation, passed successful trials. The vessel is a twin screw, Diesel engined yacht, 129 feet over all in length, 26 feet beam, 6 feet 6 inches draft. Her main propelling machinery consists of two Diesel type six-cylinder four-cycle Winton engines, each developing 225 brake horsepower. She has a cruising radius of 4,000 miles and is designed for a speed of twelve knots. The yacht is owned by Commodore Merill B. Mills, of Detroit.

The United American Lines, managing agents for the American Hawaiian Steamship Company, have extended their service from the North Atlantic to the Pacific Coast to include the port of Baltimore and have inaugurated a new service to the Pacific Coast from Mobile and New Orleans. The Baltimore service is fortnightly and the Gulf service, monthly. These services are in addition to the weekly sailings already maintained by the company to the West Coast from New York, Boston and Philadelphia. The expansion of this service to include Baltimore, Mobile, and New Orleans, involves the addition of nine steamers. The United American Line opened a branch office at Baltimore in the Maryland Casualty Building on August 14.

BUSINESS NOTES

The Johns-Pratt Company, Hartford, Conn., manufacturers of Noark fuses and protective devices, Vulcabeston packing and insulation and Johns-Pratt molded products, announces the establishment of a New York office at 41 East 42nd Street, New York.

Scheid Engineering Corporation, 90 West Street, New York City, has been appointed metropolitan and export representative for the Franklin Moore Company, Winsted, Connecticut, manufacturers of Material Handling Machinery for industrial plants.

Announcement has been made of the consolidation of the Foamite Firefoam Company, with general offices at 151 Fifth Avenue, New York, and O. J. Childs Company, Inc., of Utica, N. Y., in a program uniting these important fire protection interests under a new and complete service organization. At a meeting of stockholders recently it was decided that the company will hereafter be known as "Foamite-Childs Corporation" and the following officers were elected: Mr. W. J. Childs, president of the Childs corporation, president; F. M. Watters, vice-president; E. Janeway, secretary; and F. J. Maginniss, treasurer. Mr. James C. Patterson will continue as a director in full charge of sales. There will be no change in the sales policies of the consolidating companies. The executive offices will be located at Utica, N. Y.

TRADE PUBLICATIONS

TOWING MACHINERY.—A description, with photographs, drawings and technical data, is given in a bulletin by the American Engineering Company, dealing with its automatic steam towing machine. Detailed information on the operation of the machine is given.

LEWIS IRON.—The Penn Iron & Steel Company, of Creighton, Pa., has issued an interesting booklet on the manufacture of iron and iron products. Considerable details are also given regarding the Lewis special staybolt iron, engine bolt iron, chain iron, drill staybolts and U. S. Navy iron. Tables are shown giving the weight per foot of round and square iron.

STANDARD SEAMESS TUBES.—In No. 1, of a series of brochures published by the Standard Seamless Tube Company, of Pittsburgh, Pa., the bloom was followed through various steps to finished chipped billets. The second bulletin, showing the tube mill operations including the piercing of steel billets, has been distributed and will be followed by a third issue showing the Cold Draw Department.

METALS COATING.—A series of photographic reproductions with descriptive matter has been published by the Metals Coating Company of America, Philadelphia, Pa., which present the adaptability of commercial requirements of the Schoop metal coating process. As a protection against high temperatures, it is set forth that, by spraying with aluminum, oxidization and scaling in grate bars and similar pieces is retarded and clinkers are prevented from adhering. It is also claimed that the Schoop metal spraying process can be successfully applied to distributors and automatic stokers, condenser tubes, pyrometer couple tubes, boiler tube cleaning equipment, valves, pistons, explosion chambers of internal combustion engines, etc.

MARINE SOCIETIES

AMERICA

American Society of Naval Engineers
Navy Department, Washington, D. C.
Secretary-Treasurer—S. M. Robinson.
U. S. N., Bureau of Engineering, Navy Department, Washington, D. C.

Society of Naval Architects and Marine Engineers
29 West 39th Street, New York.
Secretary and Treasurer—Daniel H. Cox.

National Asociation of Engine and Boat Manufacturers
29 West 39th Street, New York City.
Secretary—R. R. A. Hand.

United States Naval Institute
Naval Academy, Annapolis, Md.
Secretary and Treasurer—Commander H. K. Hewitt, U. S. N.

American Marine Association
15 Park Row, New York
President—E. A. Simmons.
Secretary—Robert B. Lea.

Marine Engineers' Supply Men's Association
Room 507, 30 Church Street, New York.
Secretary—Robert P. Jones.

National Association of Masters, Mates and Pilots
National Secretary—M. D. Tenniswood, 308 Vine St., Camden, N. J.

American Society of Marine Designers
Secretary—B. G. Barnes, 47 Saville Avenue, Quincy, Mass

National Marine Engineers' Beneficial Association
Headquarters 311-315 Machinists Building, Washington, D. C.
Secretary-Treasurer—George A. Grubb.

Atlantic Coast Shipbuilders' Association
1701 Walnut Street, Philadelphia, Pa.
Secretary—C. S. King.

American Steamship Owners' Association
11 Broadway, New York
Vice-President and General Manager—Winthrop L. Marvin.

United States Ship Operators' Association
149 Broadway, New York
President—C. H. Potter

National Merchant Marine Association
Munsey Bldg., Washington, D. C.
President—Hon. J. E. Ransdell.

The Maritime Association of the Port of New York
78 Broad St., New York City
President—Charles H. Potter.
Secretary—Walter F. Firth.

Lake Carriers' Association
Detroit, Mich.
Secretary—George A. Marr.

Neptune Association
21 Pearl St., New York City
Secretary-Treasurer—Captain John F. Milliken.

Ocean Association of Marine Engineers
15 Whitehall St., New York City
Secretary—Bert L. Todd.

CANADA

Grand Council N. A. of M. E. of Canada
Grand Secretary-Treasurer—Neil J. Morrison, Box 886, St. John, N. B.

GREAT BRITAIN

Institution of Naval Architects
5 Adelphi Terrace, London, W. C.

Institution of Engineers and Shipbuilders in Scotland
39 Elmbank Crescent, Glasgow.

Northeast Coast Institution of Engineers and Shipbuilders
Bolbec Hall, Westgate Road, Newcastle-on-Tyne.

Institute of Marine Engineers, Incorporated
The Minories, Tower Hill, London.

ITALY

Collegio Degli Ingegneri Naval e Meccanici in Italia

Generated on 2024-09-12 11:23 GMT / https://hdl.handle.net/2027/mdp.39015080127403
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN